COAL AGE

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The District Superintendent

By Berton Braley

Written expressly for Coal Age

I

He is the boss of the outfit,
He is the Chief, the Nob,
The Heap Big Noise of all the boys,
The Lad with the Heavy Job,
The Owner's the upper millstone
And the men in the mine the nether,
And the supe, I ween, is in between,
And they're grinding him fine, together!

II

For the owners howl for profits
And the miners howl for pay,
And both sides whoop at the poor old Supe,
He catches it either way;
He's always in boiling water,
His life is never tame,
Whatever goes wrong it's the same old song
—He's certain to get the blame!

III

When dividends sag a little,
When work gets a trifle slack,
The working crew and the owners too
Just jump on the Super's back;
If the timbers crack in a runway,
Or a mule should get the croup,
Or, the lights go out you hear this shout,
"Oh send for the District Supe!"

IV

He always sleeps with his boots on,
He's never off shift at all,
For he's got to leap from his hard-earned sleep
Whenever he gets the call,
And if there is "hell a poppin' "
From cave-in or damp or fire,
He leads the fight by day or night
With a courage that may not tire.

V

He's boss of the hoist and breaker,
Of entry and room and shaft,
By study and fret and toil and sweat
He's mastered the mining craft,
He carries a load of worries,
His job is a damn hard berth,
He goes the route—and his pay's about
A quarter of what he's worth!

IDEAS AND SUGGESTIONS

Mine Accidents and Their Relation to Management

By Ralph D. Brown*

The industrial and labor problems become more complicated every day, bringing before us more forcibly the question of the inter-dependence of man. Every person, whether he be laborer or captain of industry, owes his fellow workers all possible diligence in the prevention of accidents. This is his social duty. The extensive "Safety First" movement is without force unless it is backed by scientific coöperation of employer and employee.

The enthusiasm of first-aid meets which have been frequently held in various coal-mine camps is induced more by the love of popular approval and rivalry than by any sense of duty. If rivalry is to be appealed to, why not have a contest with a prize for the miner who kept his working place in the safest condition without unnecessary cost, or a prize for the organized rescue party that could reproduce ventilation in a trial district under conditions similar to those met with in mine explosions or fires?

Perhaps the cheering spectators, consisting of appreciative mothers and sisters could not be provided, but the same publicity might be procured in another way. It is not our intention to detract from the value of first aid, but simply to point out that the results of negligence and ignorance should not be given prominence over the study of the cause and the prevention of accidents.

Cost of Accidents

Disregarding the human or ethical side of the question, what is its economical value? In order to apply our arguments in as practical a manner as possible, let us assume a bituminous mine in operation in the Illinois field, producing 2000 tons of coal per eight-hour shift. With this idea in view, the information in accompanying table was taken from the Illinois Coal Report for 1912.

TABLE OF ACCIDENTS IN ILLINOIS MINES—1912

Mine	Tons Mined 1912	Men Employed	Accidents Fatal	Accidents Injured
O'Gara No. 4	244,900	292	1	5
Wasson Coal Company	259,421	258	2	7
W. P. Rend Coal Company	267,441	295	3	5
Franklin Coal & Coke Co.	212,112	308	1	3
Big Muddy Coal & Iron Co.	216,445	245	0	3
Southern Coal & Mining Co.	331,987	285	1	5
Peabody Coal Company No.				
Peabody Coal Co., No. 14	366,937	390	1	4
Black Diamond Coal Co.	311,600	282	1	0
Bunsen Coal Co., No. 3	297,588	296	1	4
Clark Coal Co., Empire No. 2	253,414	280	1	2
LaSalle County Coal & Coke Co.	205,737	443	1	7
Superior Coal Co., No. 1	673,717	562	2	6
Average Mine	295,107	328	1¼	4¼

A representative mine was chosen for each district in order to obtain a fair average, and only those accidents where the injured was absent from work more than 30 days were included.

From this data we may assume that the average per year is one man killed and four seriously injured, for every three hundred men employed. Computing then the average time required for the injured to return to work, we find it is near sixty days. We will say that eight weeks is a fair figure. In case the operator chose to accept the protection of the Workman's Compensation Law of Illinois, it is possible to obtain an estimated value of the actual monetary loss for the average mine which was assumed before. One death claim at $3500 and four serious injuries requiring an absence of eight weeks' duration each, at $12.50 per week, would amount to $3900. Add to this claims for twelve nonserious injuries and numerous minor claims, and we have a total near $5500, which is a conservative estimate.

As a check on the above calculation, let us employ another method. A large protective insurance company operating in this field assumed all risk up to $5000 per individual at the rate of 2¼ per cent. of the total payroll. The average mine assumed with a yearly tonnage of 295,107, and an average labor cost of 75c. per ton, would give us $221,330 for the payroll of the working days. Add to this $20,000 for the idle days' cost and we have a yearly payroll of $241,330. Adopting the rate of 2¼ per cent. for insurance, we find that the protection for this mine will cost $5428. The comparison between this figure and the one obtained previously, indicates that we are near a fair value. There are also other items that really enter into an insurance cost, such as the hazard of a serious explosion in a large producing mine, or the loss of time due to a portion of the mine being closed on account of local fires, etc.

More Efficient Supervision Desirable

There can be no doubt but that a large portion of this insurance cost may be reduced by efficient management. Each mine may have its own peculiar problems, but general principles will apply everywhere. Much has been written in regard to more efficient management of factories, but little has been written that applies to mining. The management of a large coal mine is entirely different from that of a factory for the followng reasons: 1. The labor is more highly organized. 2. The labor is more inaccessible to supervision. 3. The product requires little technical skill from the miner. 4. The negligence of one may jeopardize the lives of all.

To obtain results in a mine, many bosses are required to personally oversee the various labors being performed. It is easy to shirk in the dark recesses of the mine, and it is also easy to break the state laws, which are made for the protection of the miner. The act may be through ignorance, or it may be done maliciously, but it is not so liable to happen if a boss is known to be constantly near. Why not apply some of the $5500 yearly expense in a practical way by hiring additional bosses as assistants to the mine manager? Let each assistant have his own special district for which he alone is responsible. The state records show that about 46 per cent. of all accidents are caused by falls of slate, rock or coal, and it is this class of injuries that can be reduced at least one-half if efficient

*O'Gara Coal Co., Harrisburg, Ill.

supervision is provided. Other classes may also be reduced materially, but here the cause of the accidents can be anticipated.

Each Company Should Employ an Assistant Mine Manager

If the mine is provided with an assistant mine manager in charge of districts working 50 men or less, the following duties of managements which are ordinarily impossible in the rush of getting out coal, could be more readily carried out:

1. Visit every working place or workman at least once every two hours.
2. Instruct miners and timbermen as to the exact location and manner of setting all timbers.
3. Personally order and inspect the delivery of all timber and track material for each working place.
4. Permit no material to be lost in the abandoned works. In some mines this item alone will pay the salaries of all assistant mine managers.
5. Allow no shot to be fired until the drilled hole and the prepared cartridge have been inspected.
6. Provide a good air current and maintain full pillar width in all working places.
7. Pay especial attention to all day men who may be doing shift work, due to the fact that their working places were unavailable at that time from falls of rock or other causes.
8. Maintain discipline and justice at all times.
9. In case a large percentage of the labor is foreign, at least one of the assistant bosses should be able to give instruction in the miner's native tongue. Accidents due to ignorance could be much reduced if a full explanation of the law and its application was made to all concerned. This is especially true in the case of gaseous mines where the safety of all is in the hands of each employee.

A Set of General Rules Not Possible

It is useless to lay down fast rules to cover every case, for each mine is a special problem. In some instances the labor question is predominate, in others, the physical character of the operation is the principal problem to be solved. Consequently, no special organization can produce the best results in all localities. There is one rule, however, that applies to all, and that is, that we insist that all company men comply with the law in every particular, and that no disobedience of the law be permitted, regardless of the cost or the question of the justice of the statute. The time to fight an adverse law is before it is passed, and not after. If the company complies with the law, it is much easier to maintain discipline among the men, and discipline is preëminently necessary.

Three Important Issues

In conclusion, we desire to point out three important issues in the safety-first movement, that will need to be more fully developed before this movement can be greatly successful:

1. Strict obedience to the law.
2. Better educational supervision.
3. Coöperation of the U. M. W. of A.

The third issue has received little attention to date, but is absolutely essential for a satisfactory solution of the problem of scientific prevention of accidents.

Education Is Not the Only Requisite in Mine Superintendence

By Charlton Dixon*

There have been several articles published in Coal Age recently, advocating the acquirement of more knowledge, profounder study and greater mental development generally for mine officials, which is commendable. The same advice might be given to the important men of other vocations with equal applicability; in fact, to everyone.

But after having been employed in a capacity which brought me in contact with a large number of mine superintendents and foremen, many of whom it was my duty to report on, I am convinced the desideratum is not a lack of knowledge so much as energy in applying the information already acquired.

With few exceptions, they were intelligent men, readers of general literature, but particularly that pertaining to their calling. One was a fair botanist, several were musicians, another was a preacher, a couple were quondam teachers and a few had been educated as engineers. In spite of such abundant education, mules were wading through seas of mud, motors traveling over submerged track, doing work particularly adapted to submarines, roads were in bad condition, rooms being lost for want of proper timbering, entries going awry, animals overworked, motors loafing on account of side tracks being too far back from the face, ventilation was poor, inspectors were dissatisfied and men were growling. The cause was not due to dearth of knowledge, but rather the failure of these officials to concentrate their education and apply it in a practical way.

A Mine Superintendent Must Be on the Firing Line

The above conditions were nearly always attributable to the superintendent's propensity to avoid the inconveniences of the firing line. In other words, inspection trips through the mines were only made when they could no longer be avoided. In order to maintain his interest in a mine, the superintendent must spend much time underground, so as to keep thoroughly posted on all that is being done. If such a policy is not followed, deterioration sets in, bringing a train of trouble in its wake; this takes the spirit out of the superintendent and foremen, filling them with regrets and future fears. The result is a wild form of paralysis of the managing faculties, often culminating in dismissal of the superintendent, the position being given to someone of less wisdom but more energy.

The combination of thorough knowledge with indefatigable physical activity is necessary to success in many vocations, but particularly so in the managing of a coal mine. It cannot be done by proxy. The work to be done efficiently must be constantly under personal surveillance. Yet many superintendents visit the inside but once a week, a few go under once a month, others only when they have to. It is a fact, therefore, that for every dollar lost by want of knowledge in mine officials, three are lost through lack of energy and application.

The Béthune Mining Co., of France, in 1904, began experimenting with reinforced concrete as a material for lining the entries, which were walled with 20 in. of ferro-concrete, supporting rolled joists which carried the roof. The experiment was so successful that the work was extended until several miles of roadway are now lined with reinforced concrete.

*Pittsburgh, Penn.

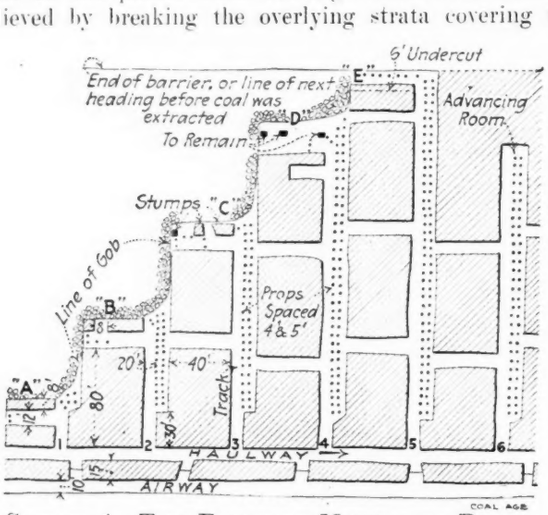
Pillar-Drawing Methods in Fairmont Region

By A. W. Hesse.*

SYNOPSIS—The method of extraction of pillars in the Fairmont field results in a loss of about 2 per cent. of the coal, in pillars so small that they crush readily when the weight falls on them. At the same time the men are protected as far as possible from roof falls.

The method of mining coal in the Fairmont region has been already briefly described,† but how to keep a pillar line just right, when robbing is in progress, requires more detailed explanation than was given in that article.

All practical mining men know that the weight, which falls on the pillars when robbing commences, must be relieved by breaking the overlying strata covering the territory from which the pillars have just been extracted. Failure to do this means, of course, that the remaining stumps and ribs must carry this weight, frequently causing the coal to squeeze, and making its extraction difficult and dangerous, if the coal is recovered at all.



Sketch 1. The Fairmont Method of Pillar Drawing

Splitting Pillar Is Bad Policy

It has always been the policy of the Consolidation Coal Co. to discourage the splitting of pillars, except when all other methods were proved or considered out of the question. Such splitting usually results in the loss of one wing when the pillar is large, and frequently the loss of both followed by a squeeze over the remaining pillars if the rooms have been driven up the full length.

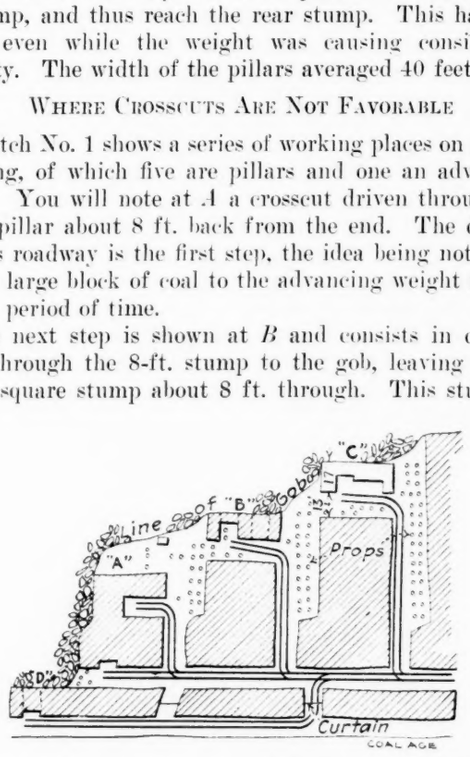
The ideal situation is to have the rooms driven up just in time to be able to return at once with the pillar. However, this is not so frequently attained as it is advocated.

The realization of this uncertainty has caused gradual widening between room centers. This gives the miner one, in fact two or three, opportunities of recovering his stumps without endangering his life or the loss of the rear pillars. If the rooms or several rooms contain falls, he may lay his track up a clear room, traverse the stumps of the rooms above, and reach the rear end of the last pillar and extract it without much fear of being cut off on the rear. He may also clean part of one room, split a stump, and thus reach the rear stump. This has been done even while the weight was causing considerable anxiety. The width of the pillars averaged 40 feet.

Where Crosscuts Are Not Favorable

Sketch No. 1 shows a series of working places on a room heading, of which five are pillars and one an advancing room. You will note at *A* a crosscut driven through the large pillar about 8 ft. back from the end. The driving of this roadway is the first step, the idea being not to expose a large block of coal to the advancing weight for too long a period of time.

The next step is shown at *B* and consists in cutting back through the 8-ft. stump to the gob, leaving to the left a square stump about 8 ft. through. This stump is then trimmed down to a size consistent with safety, usually about 3 ft., as shown at *C*.



Sketch 2. Modification of System near Original Crosscuts

Another crosscut is made in the remaining block of coal to the right, shown at *B*, leaving two stumps, as shown at *C*. The stump to the left is first trimmed down, then the track laid straight up the room and the remaining stump drawn. The finished operation usually leaves the condition as shown at *D*.

Quite frequently the drawing of the props will cause a cave at this point, but usually the next crosscut is driven before the fall occurs. At *E* where the last crosscut was driven and a barrier is left to protect the next heading, a cut or two across the rear end of the last stump gives the miner much machine coal.

Where Crosscuts Make Slab Too Thick

On Sketch No. 2 is shown a condition at *C*, which may occur due to a previously driven crosscut. This stump is 17 ft. thick, but still too thin to permit another crosscut to be driven through it. Therefore a slab is taken out for a width of 28 ft. before a cut-through is made to the rear as heretofore shown. This condition necessarily requires more timbering, which, if neglected, might cause considerable trouble, because a fall might prevent the complete recovery of the remaining coal of this stump.

If this system is consistently followed there is little doubt but that the recovery will be large, though a "slip-

*Assistant chief engineer, Consolidation Coal Co., Fairmont, W. Va.

†"Coal Age," Nov. 11, 1911.

shoot" foreman will ruin a mine in a short time if he does not give it the attention it deserves day after day. The work requires considerable attention and often makes the cost per ton high, especially if roof conditions are poor much water has to be drained and slate-handling facilities are unfavorable. It frequently reaches that maximum value where the function, recovery, becomes more important than the real object of mining coal, making a profit.

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Friction Rail Brake

The friction rail brake is a device for restraining the motion of railroad cars under tipples. The grade is arranged so as to assure forward motion at all times under gravity and the necessary restraint is obtained by use of the friction rail brake.

Usually a third rail is spiked in the center of the track, weighing from 40 lb. to 110 lb., no fishplates being used at the joints. On this rail the brake or clamp travels carrying a hook to which is attached a chain by which the car is "tethered." Motion is permitted or restrained by the raising or lowering, respectively, of a lever formed at the short-arm end into an eccentric from which the clutching power of the shoe on the rail is obtained. It is also fitted with a ratchet arrangement which works automatically when the clutch is applied rendering any sudden or accidental releasing of the brake impossible.

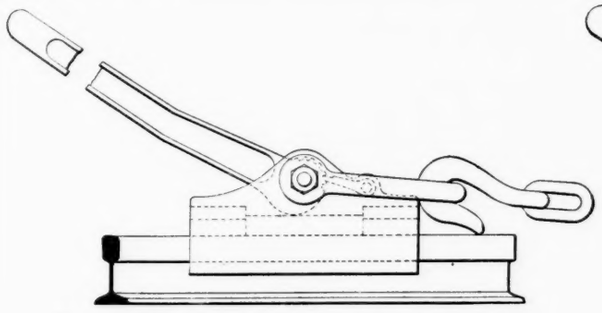

FIG. 1. CAR BRAKE WORKING ON THIRD RAIL

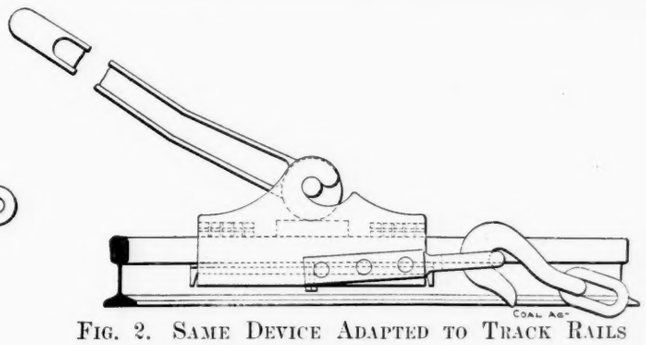

FIG. 2. SAME DEVICE ADAPTED TO TRACK RAILS

The action of the clutch upon the rail is so positive that it will stop a loaded car in motion, dead still at the will of the man handling the lever and will break a ¾-in. chain before slipping if the load is sufficiently heavy.

When the lever is thrown over toward the hook the eccentric is entirely released and the brake block can be carried or pushed back on the rail ready for another car.

Another form of brake is made suitable for use on an ordinary track in connection with patented fishplates. Both types of rail brakes are made by the Miller Supply Co., of Huntingdon, W. Va. These retarders are more reliable than car brakes on a damp day or a steep grade.

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New Development of American Mining Congress

The Committee on Ways and Means of the American Mining Congress, W. T. Griffith, chairman, reported at the recent Philadelphia session as follows and the suggestions were accepted by the unanimous vote of the members:

The Committee on Ways and Means recommend that an additional class of members, to be known as subscribing members, be created in this congress, which shall consist of corporations only and who shall have no right to vote; that the portion of funds to be raised from any state may be apportioned by the Ways and Means Committee for that state among all the mining corporations in the state in approximately such proportion as the value of the mining products of any corporation bears to the value of the total mining products of the state; that these subscribing members, in consideration of their subscriptions to the congress, shall have the right to receive all the publications, papers and other printed data of this congress and shall also have the right to request, from time to time, such information of a legislative and statistical nature, referring to mining questions, as the secretary may be able to supply from the records of the congress and it is further recommended that the secretary shall employ the necessary assistance to compile such data and to publish a bi-monthly bulletin which shall contain abstracts of pending legislation, opinions and other information of interest to the mining congress and this work be considered one of the important functions of the congress; that the Ways and Means Committee for each state as above mentioned shall consist of three members to be appointed yearly by the Executive Committee of the American Mining Congress and that the assessment for each state to be raised by these state committees shall, in the discretion of the Board of Directors, be approximately such a proportion of the total budget as the value of the mining products of each state bears to the value of the total mining products of the United States.

The smallness of the general apportionment and the lightness of the burden of any state or corporation under this scheme can be immediately seen by the record of the output prepared by the Government in which the total valuation of all products of the mines of this country are for the year 1911 in excess of two billion dollars. The total amount to be raised, we should suggest as a start, should be fifty thousand dollars, which is a small amount to provide for the proposed increased activities of the congress and this would show that for each million dollar output we are only asking for twenty-five dollars.

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West Virginia's Coal Production for 1912

The production of coal in West Virginia in 1912 reached a total of 66,786,687 short tons, valued at the mines at $62,792,234, according to the figures compiled by E. W. Parker, of the U. S. Geological Survey.

West Virginia is a vast coal field, all of the state west of the escarpment of the Allegheny Mountains being in the coal-bearing formation, the actual coal-producing area embracing 17,000 sq.m. out of a total of 24,022 sq.m. in the entire state.

All West Virginia coals are bituminous or semi-bituminous, and mostly high grade. Some cannel coal and a peculiar type known as "splint" is mined in the southern part of the state. The production for 1912 marked the maximum record. It was nearly as much as the total output of bituminous coal in the whole United States in 1882 and exceeded the total production of both anthracite and bituminous coal for the year 1877.

Cost of a 50-Coke-Oven Plant

SYNOPSIS—We give below the estimated cost of 50 beehive coke ovens. This estimate was made a few years ago by a well known authority on coke ovens for a mining operation in Tennessee. It was made in detail and is given as it was made. It is valuable to anyone contemplating the erection of beehive ovens, as well as to those who desire to make a comparison with any other plant.

Excavating, tamping and filling	$3750.00
80,000 crown and lining brick, $24.00	4320.00
6,250 tile, 12 in. x 12 in. x 3 in. at $0.10	625.00
50 sets arches at $2.75	137.50
50 sets jambs, $2.75	137.50
100 rings, $1.80	180.00
75 tons fire clay, $3.00	225.00
2500 bbl. lime, $0.10	250.00
340 tons sand, $1.00	340.00
15,000 lb. coke oven door frames, $0.02½	375.00
50 coke oven valves, $0.75	37.50
50 pcs. in. x 18 in. pipe, $0.15	7.50
20 tons cast iron bowl pipe, 4 in. dia.	500.00
50 saddles for 4-in. bowl pipe 1-in. opening	75.00
50 coke ovens (labor)	1250.00
1600 yd. stone in place, $3.75	6000.00
30 tons railroad steel	900.00
500 railroad ties	125.00
33,000 lb. metal ties, $0.02½	825.00
1300 spikes, $0.02½	32.50
Total cost	$20,092.50

STEAM PLANT

1 125-hp. boiler	$1400.00
1 pump 10 x 5 x 18	200.00
1 injector	16.00
1 feedwater heater	300.00
Pipe and fittings	150.00
Engine and foundation	1200.00
Boiler and engine house	200.00
3 tanks	450.00
Total cost	$3916.00

SEPARATING PLANT

Bins	
50,000 ft. lumber at $18.00	$900.00
Doors and windows	13.00
Bolts and washers	200.00
Foundations	350.00
1 rotary screen for coal	1000.00
1 rotary screen for coke	750.00
Elevators coal	500.00
Elevators coke	500.00
Crushers coal	750.00
Crushers coke	750.00
Total Cost	$5713.00

STORAGE BINS

Storage bin	$200.00
Robinson washer, complete	15,000.00

HOUSES, STORE, ETC.

25 houses at $350.00	6250.00
1 house	750.00
1 store building complete with fixtures	1000.00
1 barn	300.00
1 tool house	100.00
Total cost	$8400.00
Laboratory	
Building	$200.00
Fixtures	600.00
Total cost	$800.00

EQUIPMENT

7 head live-stock, $150.00	$1050.00
2 larries, $325.00	650.00
1 tool box	10.00
2 stoves	10.00
12 leveling, $1.00 bars	12.00
2 levelling scrapers, $5.00	10.00
2 levelling barrows, $7.50	15.00
10 coke barrows, $9.00	90.00
10 sets hose, $5.00	50.00
20 scrapers, $3.50	70.00
1 railroad truck	25.00
10 running boards, $1.00	10.00
12 ladders, $0.75	9.00
1 drill press	50.00
1 pipe dies	90.00
1 steel stamp	2.50
1 set steel figures	2.50
1 carpenters vise	5.00
1 blacksmith combination vise	15.00
1 set branding irons	1.00
1 anvil	25.00
1 screw plate and dies	15.00
1 pair platform scales	40.00
1 100-ton railroad scales in place	950.00
1 Grindstone	10.00
50 grain sacks	9.00
2 carts	40.00
1 wagon	40.00
1 pump	450.00
Add 5 per cent	187.00
Total cost	$3943.80

Tools

1 ax	$1.50
1 bar (spike)	1.50
1 bar (crow)	1.50
3 bars (pinch), $5.00	15.00
4 buckets, $0.40	1.50
2 brooms, $0.35	0.70
1 basket (feed)	0.50
6 brushes, $0.50	3.00
1 cold cutter	0.50
2 cars (oil), $1.00	2.00
2 chisels (cold), $0.50	1.00
1 cutter (H)	0.50
6 curry combs, $0.25	1.50
2 fullers, $0.50	1.00
2 flatteners, $0.50	1.00
6 files, $0.25	1.50
1 flue expander	15.00
2 hammers, set, $0.50	1.00
4 heading tools, $0.50	2.00
1 hatchet	0.50
3 hoes, $0.40	1.20
1 hoe (mason)	0.75
2 hammers (spike), $1.50	3.00
3 hammers, $0.75	2.25
2 hay forks, $0.75	1.50
1 jack (hoisting)	9.00
1 jack (curving)	20.00
3 lanterns, $0.75	2.20
2 oilers, $0.50	1.50
2 picks (clay), $0.75	1.50
2 picks (RR), $0.75	1.50
3 punches, $0.50	1.50
6 padlocks	9.00
1 riveting machine	5.00
2 saws	2.00
2 spirit levels, $2.00	4.00
1 square	1.50
1 set shoeing tools	5.00
2 swedges, $0.50	1.00
6 shovels (coal), $0.75	4.50
2 shovels (RR), $0.75	1.50
1 sledge	0.75
2 shovels long handle, $0.75	1.50
2 shovels scoop, $1.00	2.00
1 syringe	0.50
1 pr. shears	1.00
6 pr. tongs, $1.50	9.00
1 track gauge	3.00
5 wrenches, (S), $0.75	3.75
4 wrenches monkey, $0.75	3.00
3 wrenches box, $0.75	2.25
1 wagon jack	5.00
Total cost	$167.00

RECAPITULATION OF COKE-OVEN ESTIMATE

50 coke ovens, bee hive type	$20,092.50
Steam plant	3916.00
Separating plant	5713.00
Storage bins	200.00
Washing plant	15,000.00
Houses, store, etc.	8400.00
Laboratory	800.00
Equipment	3943.00
Tools	167.00
Grand Total	$58,232.00

State Mine in Victoria, Australia

The province of Victoria has a state mine at Wonthaggi, which reports a profit of nearly $50,000 last year. Its gross output was 470,261 tons for the 12 months and the daily tonnage was about 1800 tons. Only 454,421 tons were shipped to market, the rest being used by the miners and the power house.

The mining rate is 66.6c. per ton. This was fixed after a strike lasting from Apr. 4 to May 17. The men had demanded that the three-shift schedule be changed to two and in return the manager sought a reduction in the mining contract from 73 to 66.6c. per ton. Eventually the men conceded this reduction. The average wage earned per day under the new contract is $3.29.

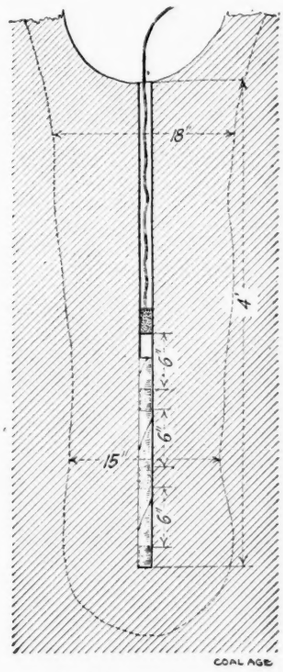
It is estimated that the coal area exploited by the Wonthaggi mine contains 26½ million tons. The area covered is 5100 acres. The plant uses electricity for hoisting, haulage, ventilation, coal cutting and pumping.

The equipment consists partly of engine-driven generating sets producing 3-phase alternating current at 5200 volts and a frequency of 50 cycles. This is supplemented by Curtis turbo-alternators generating 530 kw. with exhaust and 1000 kw. with high-pressure steam.

The value of the plant is about $800,000 so the profit last year was over 6 per cent.

Blasting Pole Holes

The holes made for telephone and other poles can be blasted by electricity according to Vandeventer and Warren, telephone engineers, writing in the *Dupont Magazine*. The holes should be 4 ft. deep for a 20-ft. pole to 7 ft. for a 50-ft. The average hole is 4½ to 5 ft. deep. Poles are set for telephone service 150 to 175 ft. apart with an average of 35 to the mile. The holes have a diameter varying from 14 to 18 in. The cost of digging holes for 25-ft. poles by post-hole diggers is about 58c. each.



ARRANGEMENT OF CARTRIDGES

When blasting the holes by dynamite, the explosive should be distributed in the hole, as a charge at the bottom only, does not open the hole at the surface. A 4-ft. punch bar can be used for making the cartridge hole. It can be driven into place with a sledge and if knocked sidewise when driving can be removed without difficulty.

THE DYNAMITE SHOULD BE DIVIDED INTO SHORT CARTRIDGES

As the dynamite must be distributed, much time can be saved by making up cartridges of paper, 4 ft. 6 in. long, by rolling stiff wrapping paper round a stick of proper diameter and fastening four quarter sticks of 40 per cent. dynamite about 6 in. apart beginning at the bottom, as shown in the figure.

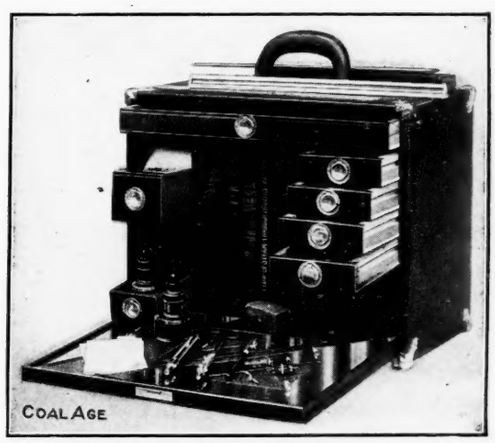
These small cartridges can be kept in place by the use of ordinary housewife's pins, stuck through the walls of the paper tube. This spaces the dynamite plugs properly and leaves a free space between them, thereby insuring the firing of the lower pieces, the cap always being placd in the top piece. Without the paper tube, there is some danger of the lower pieces not exploding, especially if much loose dirt intervenes. Water does not affect the proper exploding of the lower pieces, but loose soil does. A convenient way of placing the pieces of dynamite is to have a stick with marks 1, 2, 3, 4, etc., on it, and push the pieces into the tube one at a time and pin them in place.

There is no need for using an electric exploder, but the use of safety matches is suggested. The fuse need project only 2 or 3 in. above the surface, and should be bent to one side. The operator is safe in staying within a few feet of the hole, when the dynamite is exploded, as there is no general upheaval of earth. An ordinary post-hole digger is desirable for removing the loose earth. No digging bars are necessary, the earth being well broken. The average time for cleaning is from 5 to 10 min. and the cost for dynamite 8½c., fuse and matches, 1c.; labor, 14c.; supervision, 3c., in all 26½c. The explosion hardens the sides of the hole and makes tamping around the pole, when set, less laborious. About 30 to 50 holes a day can be made by 5 men.

Draftsman's Chest

The draftsman's chest shown requires little explanation and is designed so as to be compact and at the same time to form a handy storage for all commonly used draftsmen's tools.

The case is covered with leatherette and the drawer fronts are solid mahogany. The top drawer is large enough to take scales, rules, etc., while the smaller drawers are used for the smaller instruments. The small drawer on the left is for a card index in connection with a vest-pocket, morocco-leather loose-leaf memorandum. The slide for ink bottles provides for three bottles and it will be noted that there is room for several reference



VIEW OF THE DRAFTSMAN'S CHEST

books. The tray is the door or cover and is provided with brass cylinder locks and two keys. There is room provided back of the cover, when locked, for triangles, curves, etc., while under the drawers on the right-hand side there is provided a pigeonhole.

This case is a recent product of the American Drafting Furniture Co., Rochester, N. Y.—*American Machinist.*

COLLIERY NOTES

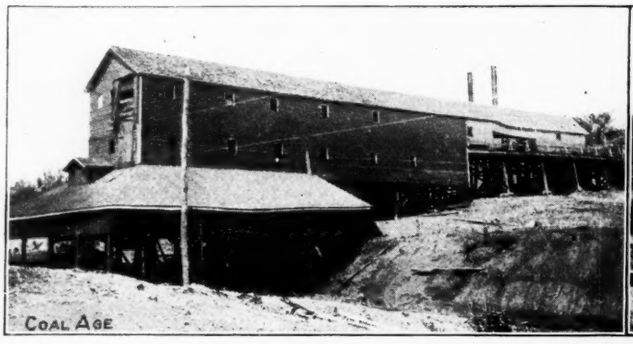
The economical limit of animal haulage is reached at about 1500 feet.

An acre of coal 1 ft. thick is estimated to contain about 1800 tons. From 1200 to 1400 tons is usually minable.

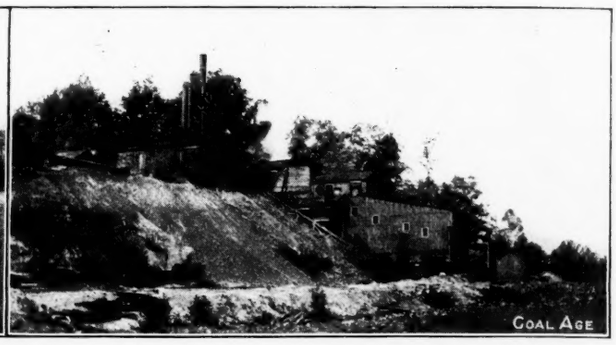
Experiments are being conducted in Germany to discover the usability of liquid air and liquid oxygen as explosives for mines. The liquid oxygen is mixed with aluminum powder and detonated, producing a force 2½ times that produced by black powder. One advantage that it possesses is that no bad fumes are produced.

The Administration report on the railways of India gives the number of tons of coal mined in India during the year 1912 as 14,706,339. Of this amount 4,590,618 tons were used by the railways, while 1,325,238 tons were exported to ports outside of India. There was also imported into India 144,804 tons of coal from the United Kingdom and 415,987 tons from other countries.

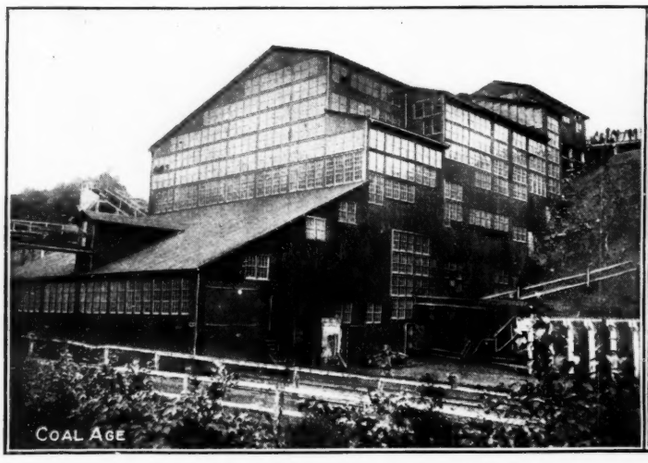
SNAP SHOTS IN COAL MINING



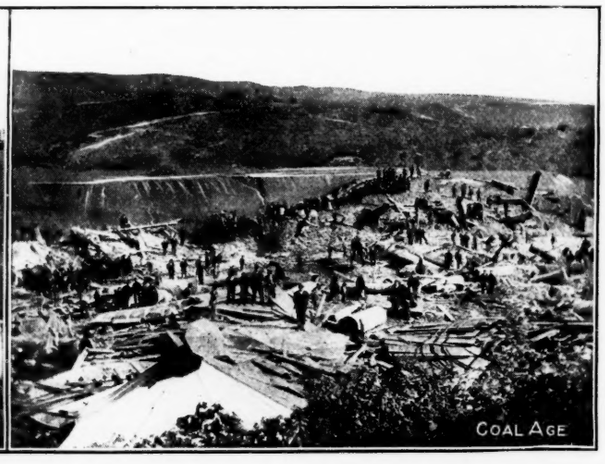
DUNCAN COAL CO., LUZERNE, KY. TIPPLE IS EQUIPPED WITH LINK-BELT SCREENS



TIPPLE AND POWER HOUSE OF NORTONVILLE COAL CO., AT NORTONVILLE, KY.



TREVORTON MINE AT SHAMOKIN, PENN., NOW WORKING IN THE NORTH FRANKLIN SEAM



AN OLD PHOTO, SHOWING RESULT OF BOILER EXPLOSION AT THE HENRY CLAY ANTHRACITE COLLIERY

A ROOM IN MINE OF THE ROSEDALE COAL & CLAY PRODUCTS CO., CALGARY, ALTA.

SHOWS STYLE OF TIMBERING EMPLOYED IN ENTRIES OF ROSEDALE MINE AT CALGARY

Discussion of Miners' Compensation Laws*

SYNOPSIS—Full text of a most interesting and profitable discussion of compensation laws as they affect the miner and the operator, in coal mining. Description of the working of such a law, in Illinois, given by Thomas Moses, superintendent of the Bunsen Coal Co., Westville, Ill. Minor accidents previously disregarded are reported under the law. Conditions in other states—Alabama, Indiana and West Virginia discussed by mining men from those states.

THOMAS MOSES (*Illinois*)—In the passage of this law, the Illinois Legislature was much divided; the laboring people of the state were also divided. One board of organized labor was asking the legislature to pass the law, while the Federation of Chicago and the Board of Labor there were working for its defeat. Many were lobbying for the passage of the law, others for its defeat; but after a strenuous fight, the law was enacted. It was so amended that any person employing labor could elect to come under the law, or if they wished, reject it. The law was made optional with employer and employee. But any person who refused to come under the Compensation Law thereby forfeited the right to the "fellow-servant plea," or to assume risk for liability. Few coal companies, as I understand it, elected to operate under this law. Insurance companies who kept track of legislation of this nature, immediately raised their rates. The small operator became afraid to go under the law, for fear that an accident would throw him out of business. The insurance companies, as I am informed, made their rates so high, that the small operator was forced to go almost without insurance of any kind, and fight his own battles with his men and settle his liabilities as they arose.

ELECTED TO OPERATE UNDER THE LAW

The company by which I am employed, however, elected to operate under the Compensation Law, although there was much uncertainty as to the outcome. Close figures were kept on the cost and also on the accidents, which we were making strenuous efforts to reduce. We improved the equipment in the mines, to make them safe and sanitary; in fact, we put the mines in first-class condition, and adopted the slogan "Safety First" in and out of the mines. It surprised us to find that the accidents, after making these improvements, increased wonderfully. We had a greater number of accidents the first six months, under this law, than had ever been known in the mines before.

We were much concerned about this. We searched the records and found that the reason for the great increase in the number of accidents was explained by the fact that many accidents were being reported now that had never been reported or thought of before. A man would get his finger mashed, or cut a little, and he would at once go to the doctor and have it treated, which was then reported as an accident, and he was paid compensation, if he was off duty the required length of time. The law requires a man to be off nine (9) days before he is entitled to receive compensation, and then he gets one-half of his average earnings in the past. If he is killed, I do not recall the exact percentage to be paid, but the minimum amount is $1500 and the maximum $3500. The difference is gaged by the number of dependents and the earnings of the deceased before his death.

We found that when there was no claim for liability, a man who mashed a finger, or had a chunk of coal fall on his toe, or had a similar slight accident said nothing about it, as a rule, but went on with his work. But, under the compensation law, he would wait till perfectly well before he would return to work. The majority of miners (it proved so in our case) belong to the Mutual Mine Workers Benefit Association, and get a sick benefit of about $5 a week, for a certain number of weeks. Nearly all of them belong to one, two or even three sick benefits; so that the average miner, when he is getting half wages from the company and his sick benefits besides, can make more money than if he was working. That is one thing that helped to increase the number of accident reports.

EFFECT ON LITIGATION

I would draw attention to one point in the law that must be carefully guarded against, wherever such a law is enacted. It is as necessary to prevent the miner who is a rascal from cheating his employer, as it is to prevent the rascally operator from cheating his employees. We have had three law suits under this Compensation Law. The facts to be proven in court, in these cases, are, first, that the injury actually exists, and, second, the extent of the injury. How it happened does not enter into the trial; it makes no difference how it happened, the employer must pay for the injury. The extent of the injury may sometimes be questioned; as it often happens miners claim to be hurt when they are not hurt. I will mention one case.

The day after New Year day a miner in our employ came to the mine a little the worse for wear, and went to work in an entry. About 10 o'clock he went out sick. Some two or three weeks after this he made application for compensation, claiming that he was injured on that morning. I called the man to the office and asked him how he was injured. "Well," he said, "I went into the entry and the air was bad; it was full of blackdamp and I was overcome; it so poisoned my system that I was unable to work any more." I then called in the boss and others who had charge in the mine and they stated at once that in that particular part of the mine there was no question about good air. We investigated and found this to be a fact. We found that on the day this man claimed to have been overcome by bad air, the man in the next entry had worked all day, loaded ten tons of coal and drilled a hole and said he felt no effects whatever. The miner, however, pressed his claim, which I refused to pay, and we went into court.

The court adjustment is as follows: The complainant selects a man, and the company selects another, then the county court selects a third man, and a trial is held before this commission. But here is the weak point in the law. When the complainant selects his man, he is going to select one who is friendly to him; and the company, likewise, selects a man friendly to them; and the county court man is the only unbiased man. It appears to me

*From the published Proceedings of the sixth annual meeting of the Mine Inspectors' Institute, U. S. A., held at Birmingham, Ala., June 10-13, 1913.

therefore that he would be sufficient alone to try the case. We tried the case, however, subpoened every man who worked in that part of the mine or had any business there, as a witness, and their testimony was all about the same, with the result that the commission threw the case out of court.

We have had three suits, in all, of this same nature. There is no question but that we will be held up by some of the men; but I must say, we have been given a fair deal. For 11 years previous to the time we started under the Compensation Law there never was a case of litigation that went to a jury but that the claimant got a verdict. A coal company never won a case in that county, for ten years. Of course, some cases were thrown out of court; but if it went to the jury, almost in every instance a verdict was returned in favor of the injured person. Since the Compensation Law went into effect, we have had three law suits and won all three; because it seems to have changed the sentiment toward the coal companies.

Men Report Violations of Law

Another thing: The men, in their daily work, don't hesitate to report one another when working in dangerous conditions; and they don't hesitate to stand up and tell just how an accident occurred. Previous to that, when a man was hurt or killed, the boss and all the witnesses were summoned; and if they happened to be foreign-speaking men, they immediately could not talk. Then, we had to get an interpreter, and he told the men just what to say and what not to say. Now, they can all talk at an inquest, and there is no trouble in getting them to tell the truth. Formerly, when an accident happened the boss would try to cover up the facts, if he was the least bit to blame. It was hard to get at the truth, under the old system; but now it is no trouble to find out exactly how an accident happened. We have a good fellow feeling among our men, which I think the Compensation Law is bringing about.

Two weeks ago I was invited to the local of one of our mines, when they had some matters to be brought up for discussion. I went and the proposition was made to me: "Mr. Moses, we are interested in your campaign for safety; we believe that you are honestly trying to do all you can for our protection. We visit back and forward a good deal during the day, and we want to make you this kind of a proposition: That every time we see one of our men working in danger we will report it to the boss, if you will agree to compensate us for the time that it takes. We ask this because we don't want to be regarded as carrying tales to the boss; if you give us the right to report to the boss and he does not recognize and remedy the danger, then we will report to you." Such a condition is only possible since the Compensation Law went into effect; if one had thought of making such a proposition before, he would have been thrown out of the window.

We have heard here, again, as we have heard at other sessions, that we do not have in the mines today the practical miner that we had some 30 years ago; coal is not dug today in the manner it was 30 years ago. We had, in our mines, in this country, then, a majority composed of English, Irish, Scotch, Welsh and German miners; and we wonder where these practical miners have gone. We recall that the doctors 30 years ago were not as good as the doctors of today; the lawyers 30 years ago were not equal to the lawyers of today; the merchants 30 years ago are not to be compared with the merchants of today. Advance has been made in every occupation, either professional or industrial, with the exception of coal mining; and we all admit that the miner today is not as good as the miner 30 years ago. Now, there is a reason for that; and the reason, in my opinion, is that the father has seen that he has no future in the coal mine; the battle was too hard against him and he naturally advised his sons to go into some other business, where the chances for advancement would be better. The sons have followed the advice of the father and taken up other lines of work.

Whenever we create in our mines a condition unfair to our employees, they will migrate into other callings. We must take them into consideration; we should be forced to do it, whether we want to or not. We should be compelled to provide for them in case of accident, and provide for their dependents, in case of death. The law should compel us to furnish first-class equipment for every mine, and to care for those injured by accident. When this is done, we will see the standard of practical miners grow, as we have seen the standard of every other occupation grow.

Now, I am not going to take up more time, because there are many angles and I cannot touch on them all; but I will be glad to answer any questions that I am able to answer regarding our experience with this matter. I will say this, however, we do not regard the Compensation Law of Illinois as perfect—far from it; but it is a step in the right direction—it is on the statutes and will never come off; and what is more, it is bound to be placed on the statute books of every coal-mining state. The thing for us all to do is to get busy and find out what is the best law. The principle is just and fair. There can be no question but that the operator is rightly obligated to pay what the coal miner has the right to claim; and the price of coal to the consumer must cover the cost of accidents as well as the cost of production. If it costs a human life to dig 300,000 tons of coal, should we not sell that coal with a view of compensating as far as possible for that loss of life? If we can mine 500,000 tons per life lost, so much the better; but the present death rate is 300,000 tons.

About two weeks ago I was called to Chicago where a number of men (employers and employees) were trying to eliminate some of the objectionable features of the Compensation Law. I am not a lawyer, but I want to state that there are some honest men working hard to overcome the dangers that stand in its way. The law at present meets opposition from the insurance companies, because it considerably reduces their business. It meets opposition from the lawyers for the same reason. Every dollar paid in compensation for injury or death goes to the man injured, or to his dependents if he is killed. The lawyer does not get it and the courts do not get it. They have never been entitled to one cent of that compensation.

Effect of Law to Raise the Standard of Mining

Mr. Bolt (*Illinois*)—I would like to ask Mr. Moses whether or not the operation of the Compensation Law in Illinois has had a tendency to raise the standard of the men employed in the mines; and what bearing it will

have upon the education of future generations of men employed in the mines.

MR. MOSES—I think it will have the effect that when a person is injured at a coal mine he will not be burdened with the thought that those dependent on him will have to suffer for lack of support. With the knowledge that in case of accident the necessities of life will be provided for those dependent on him, I believe the tendency will be to uplift the men who work in the mines.

MR. BOLT—But, to what extent will the amount paid as compensation benefit the family in an educational way. My father was a coal miner and his children were all educated in the coal mines. During his life time he had several serious accidents; and the only compensation received came from his immediate family. Of course, the only persons who suffered through his injury were himself and his immediate family. What I wanted Mr. Moses to explain or bring out was the fact that the real and lasting benefits to be derived from the adoption of a compensation law will be the education of future generations of mine workers. It will prove a greater benefit to the children of the injured parent, rather than to the parent himself, and, for that reason I claim that by the adoption of such a law throughout the United States, whereby employees will be compensated for injuries and their dependents, in case of death, the people who are going to be especially benefitted by that law will be the future generations, because they will be provided with food. clothing and shelter and, above all, a common school education.

The coal companies of this country as a whole ought to stand for higher education in the mines, first, last and always; and I believe, if they will do this, the day will come (it is not now, and we may not even live to see it) when coal operators will thank every person who had anything to do with the uplift movement and improving the condition of those in their employ. When we make a man a thinking man, a man capable of looking after his own interests, we create a man who will look after the interest of his employer, and this will foster a spirit of fairness. For that reason I believe (and I think you will agree with me) that the adoption of a compensation law—a comprehensive and sanely-worded compensation law—in all of the states is going to elevate by educating those who will be our miners in the future.

MR. MOSES—I heartily agree with Mr. Bolt in all he has said, and will say further that the compensation law is intended to relieve distress and if you relieve distress, you are going to elevate the condition of the people you relieve.

T. C. I. PLAN IN ALABAMA

MR. FLYNN (*Alabama*)—While Alabama has no compensation law, our company has been operating, for the third year now, under what is known as a voluntary-relief plan. That plan is similar, in fact almost identical, with the one Mr. Moses has just explained; and what is law in Illinois, is the adopted policy of my company in Alabama. I do not fully agree with Mr. Bolt; I believe that the Compensation Law *will* assist to educate the present generation of miners. As I said last evening, in my opinion, 80 per cent. of the safety in coal mines depends on the education of mining men. I can say for Alabama, the state where I have the most knowledge of mining conditions, and the most intimate experience in mining operations, that when you put on the statute books a law requiring coal operators to compensate their employees for accidents, you can rest assured that the companies will get busy; because it is cheaper to educate men to exercise due care than to pay for accidents.

Our company is carrying on a thorough system of education. We have men who constantly visit every mine employee. Experienced and practical men are employed continually to see that a miner does nothing that is unsafe. It is their duty to explain to the miners the practical and safe way. We are educating the present generation of miners up to a higher standard of realizing the dangers to which they are subject in their daily occupation.

Mr. Moses' statement that miners are deteriorating fast may be true enough, because parents are not taking their boys into the mines as they did years ago; and for the further reason that, in the earlier history of this country, coal mining was the only practical trade open to miners that came to this country from Europe. They had been coal miners themselves; this was a new country; coal mines were just being opened up; and, for that reason, they naturally went into the mines. Labor conditions here were not so crowded as in the countries from which they came. Over there, all of the industries were practically crowded; there was all the labor wanted for any kind of industry. That is not the case in this country, especially in Alabama. There has been a scarcity of labor for a number of years; and today some six or eight thousand men can find employment if desired. The rapid development of our coal mines has started other industries, and blast furnaces, steel plants, rolling mills and railroads have been built all over this country. These numerous industries have taken many of the younger generation from the mines, which explains why they have gradually drifted into other occupations.

I remember my father was a blacksmith by trade, but his eyesight became affected by constantly looking into the bright light and he had to give up his trade and go into the mines. Like 90 per cent. of other workers, he took his boys with him, as soon as they were old enough to go. But my father was very solicitous for the safety of his boys, more so than for himself; and the very fact that he had his own flesh and blood in the mines with him made him a much more careful employee than if he had had no responsibility other than looking after himself. But to return to the system of education and the voluntary-relief plan, aside from the human side of the question there is also a moral side. The human side would be considered on account of sentiment, but I have always contended that all the wealth of the world will not compensate for the loss of one human life.

To my mind, the Compensation Act will do much to educate the miners up to a higher standard, and they will protect themselves and prevent accidents, by teaching caution; because the company will soon only employ men with a practical education. I believe there are in the coal mines of the Tennessee Coal, Iron & Railroad Co. as many practical miners today as 30 years ago, notwithstanding the fact that they have,as laborers, mostly non-English-speaking men. Today 40 or 50 per cent. of the miners are negroes, and only about 20 per cent. are non-English-speaking foreigners from southern Europe—

English, Irish, Welsh, Scotch, etc. That class of labor is not coming to Alabama now, in such numbers as formerly. The contention is that the condition of miners in Europe now is better than in America; and they are more contented and less inclined to leave their native country. I think this is true, but if we have this class of labor we must educate them, and our company has succeeded in educating them up to a point that they exercise due care in regard to their own safety.

We have many accidents from absolute carelessness; we will always have them. We all get careless, at times; we work under dangerous conditions. I always tell the miners when I am going around the mines that I am never afraid of a man getting hurt in a place that he things is dangerous. It is the coal that the miner thinks will not fall, that catches him. I often say, in talking to the miners: You can gamble on making it 7 or 11; you can gamble on throwing nine; but you cannot afford to stake your life against a piece of rock or coal not falling; because when you lose your life you have lost all. If you want to gamble, then gamble on something less valuable than your life. As I said last night, I believe if the inspectors and mine officials would exercise all of their ability and use all the time at their command, to insist on miners doing their work in a scientific and safe manner, I believe we could cut out 50 to 75 per cent. of the accidents that occur from carelessness and negligence, or trusting to their own judgment as to the danger of rock or coal falling.

Advocates the Apprentice System

I advocate a system of apprenticeship by which to raise the standard of efficiency to that of the practical miner of other days. This system was opposed by the organization to which practically 90 per cent. of our miners belonged. The system that I believe has done more to eliminate the practical experienced miner than any other system is the apprentice system. Organized labor is bitterly opposed to what they term the "labor system," where one man takes in a helper until the helper becomes an experienced practical man. They claim every man ought to have an equal share of what he makes. I don't believe in such a theory. I believe in the apprenticeship system in coal mines; and I believe if we had a compensation act, that the miners themselves would realize that mining is a skilled trade. There is an art in mining, and it requires skill to perfect one's self, just the same in coal mining as in other trades. In all other trades they have the apprenticeship system, why not in mining?

If we had the apprentice system, the operator would be more careful in the selection of labor that he placed in his mines; he would not be willing to endanger the lives of 150 or 200 practical men for the sake of putting in some inexperienced man, who by reason of his inexperience would perform some act and cause the loss not only of his own life, but that of every man in the mine. They would be more careful in the class of labor they selected, and would educate them up to a higher standard of efficiency. We have got to have labor to operate our mines; and in order to replace the labor that is drifting away from the mines, we have got to adopt some method that will fill the mines with practical miners, who will educate their fellows to take care of their own safety. I am a firm believer in a compensation law for all classes of workers in coal mines as well as in all other trades.

Commission Appointed in Indiana

Mr. Pearce (*Indiana*)—I wish to say, for Indiana, that it is, at the present time, one of the few coal-producing states that has no compensation law; but I am glad to say that there has been a commission appointed, which met the first of this month; and there is little doubt but that this commission will recommend a compensation law that will be passed by our next legislature. I am a firm believer in a compensation law, and am convinced that if any state hopes to promote progressive legislation it must not oppose the enactment of such a law. I understand that, at the present time, the constitution of most of the states prevents the enactment of a compulsory compensaion law; but I feel sure that within the next two years, Indiana will have enacted, as nearly as possible, a model compensation law.

The statement has been made that we have not made the advance we should in the mines; or we have not today the practical miners that we had some 30 years ago. We must remember, however, that mining conditions have advanced very rapidly in 30 years. We are mining coal today with electrical machinery; and electrical equipment has been installed in our mines; and we are working under entirely different systems that were not thought of 30 years ago. I believe we have as practical men, and I might say, even more practical men in the mines today than 30 years ago. Our mines are developed on a more scientific and practical basis and a larger scale of operation, giving greater efficiency both for the operator and the miner, and producing a maximum output of coal at a minimum cost.

The West Virginia Law

Mr. Martin (*West Virginia*)—I am glad to be able to report that West Virginia is one of the states that has adopted a Workman's Compensation Law. The law, however, has been in effect less than a month and I have had no time as yet to read or consider it, and am therefore unable to say much as to its good or bad points. Nevertheless, we have it and it has come to stay. We believe that in a few years it will work out its own defects. West Virginia has had a great forward movement in respect to the safety-first idea. I believe that the compensation law, which will compel the operator to make compensation for workmen injured or killed, will have a tendency to reduce the number of fatal accidents. We can see an improvement in that direction already. Many of the companies have put on district bosses to take care of from 25 to 40 men. Previous to a year or two ago, this movement had been given very little consideration in West Virginia. The mine foreman was supposed to visit all working places, in compliance with the mine law; and in many cases he was unable to do justice, in respect to the safety of the mine. We have also been studying the question of humidity in the mines, and many companies have installed appliances to reduce the quantity of dust, by sprinkling, using a pipe line and hose. This, together with a special system of timbering, which many companies have installed, we believe, will go a long way toward reducing the death rate in the mines of the state. And so, as I said before, I am glad to say that West Virginia has enacted such a law.

POWER DEPARTMENT

Machines for Continuous Current

By C. A. Tupper*

SYNOPSIS—The second of two articles upon this subject. It deals with motors and the precautions that should be observed to insure the successful and continuous operation of this class of machinery.

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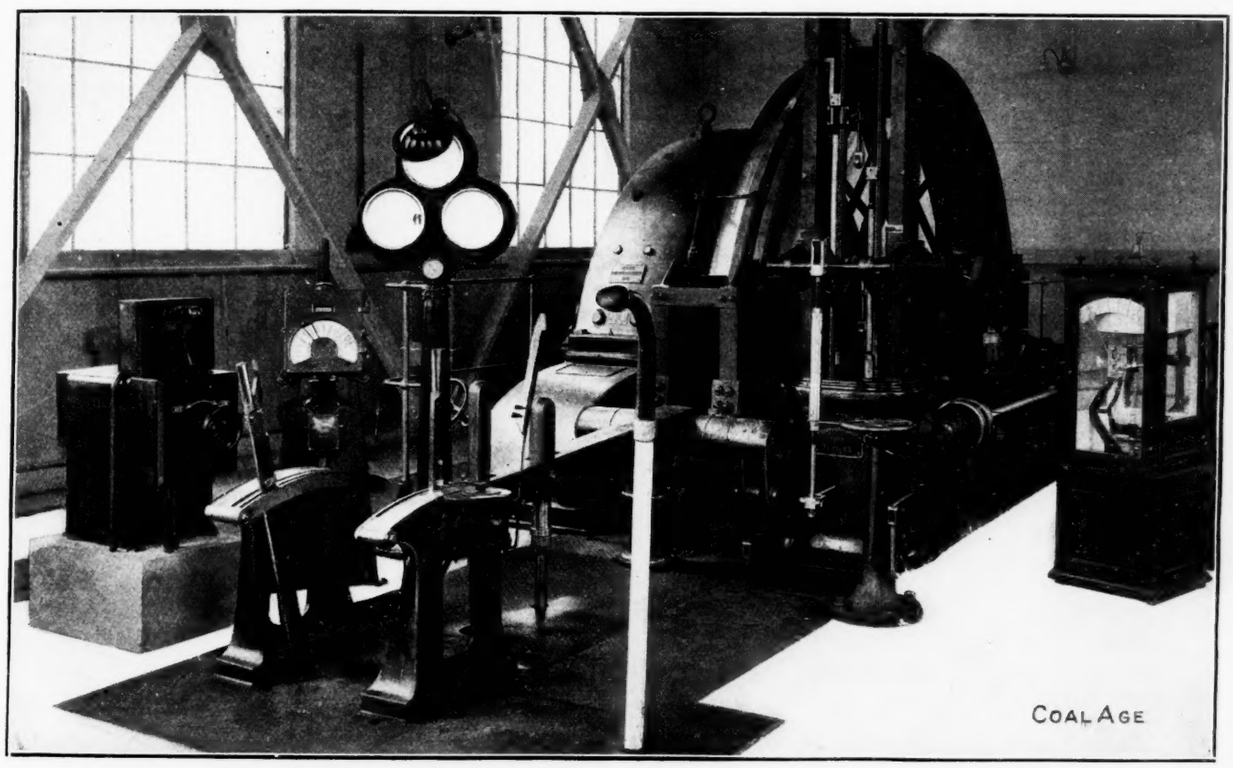
The greater number of the previous observations on the installation and operation of generators also hold good for direct-current motors, allowing for the usual differences in the size of the machines. The following, however, applies particularly to the three types of motors.

As an especial precaution to observe, do not attempt to start a shunt-wound motor until you have tested out the field circuit and made certain that it is closed. Failure to do this has caused much trouble and expense to coal-mine operators installing new motors. This test can easily be accomplished as follows:

If an automatic-release starting box is used, remove the armature lead at terminal, usually marked "Arm" at box, and carefully insulate end of cable. Then close the main switch, also starting-box lever, and note whether the release coil holds the lever in position. This coil is in series with the field and hence insures a closed circuit.

Again, with the above conditions, go to the motor and with pliers or a piece of iron note whether the poles give a strong magnetic pull. In doing so be careful not to touch the field terminal with the piece of iron, thus grounding or short-circuiting the field. As a final and third test, slowly open the main switch, and if an arc results, the field circuit is complete. Open the main switch and replace the armature wire at the starting box. If the fields are separately excited through a field switch, the above tests can more easily be made.

When connecting a motor supplied with a starting box having no voltage release, it is important that the lead from the motor be connected to terminal marked "Arm" and lead from switch to terminal marked "Line."



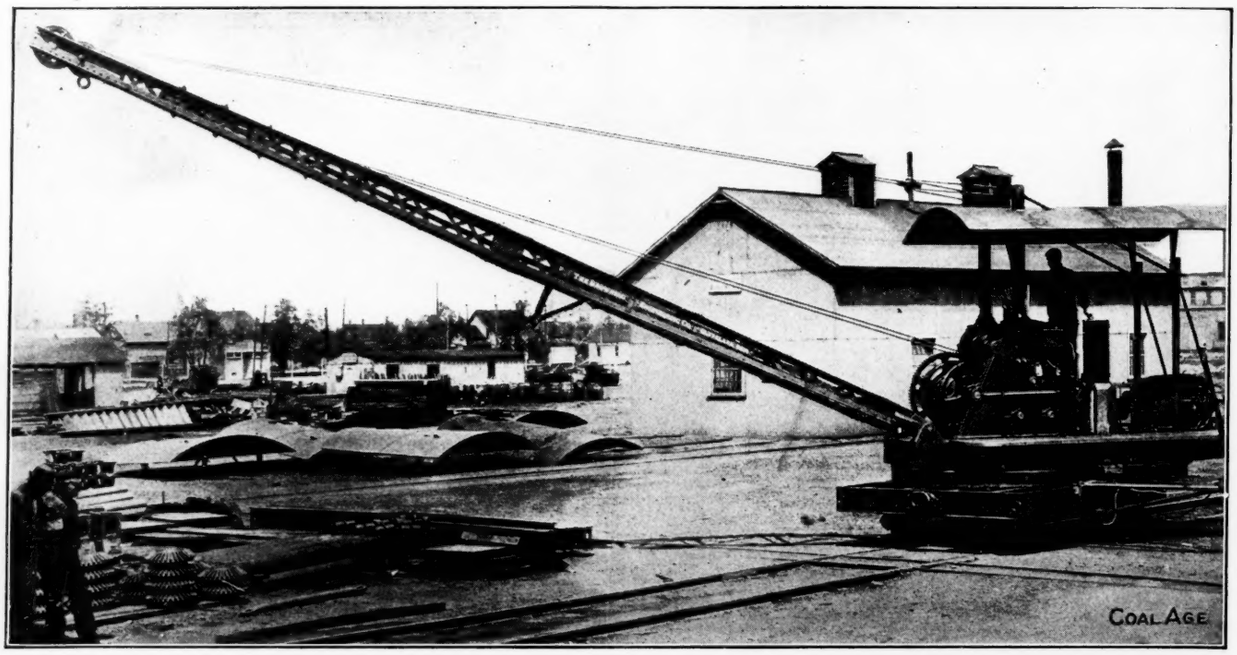
A Continuous-Current Motor Geared to a Mine Hoist

To start up, close the main switch and gradually cut out starting resistance until the motor runs at full speed. See that the armature oscillates in its bearings and that the oil rings are carrying oil. If speed seems excessive, check connections to see that no coil is in backwards.

If a field rheostat has been provided for increasing speed, see that all resistance is out of the circuit when starting.

The directions given for shunt-wound motors will also apply to compound machines. In case the speed is above normal, the series field is probably opposing the shunt. If sufficient starting resistance is at hand, the motor should be tried as a shunt and as a series machine. In the latter case do not attempt to get the motor up to speed. Just

*C. A. Tupper, Cleveland, Ohio.



COAL-UNLOADING CRANE DRIVEN BY CONTINUOUS-CURRENT MOTOR OF THE MINE-LOCOMOTIVE TYPE

allow it to turn a few revolutions to see that it runs in the same direction as when running as a shunt motor. This test should be made under no-load conditions.

After testing for rotation as above, make permanent connections and start up the motor.

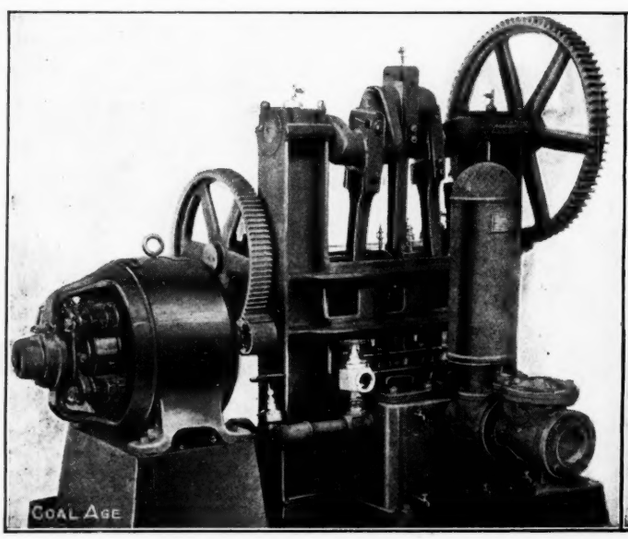
Never attempt to start a series motor without load, as it will attain a dangerous speed. On starting, gradually cut out the resistance, and on shutting down put it back into circuit.

RULES TO BE ALWAYS OBSERVED

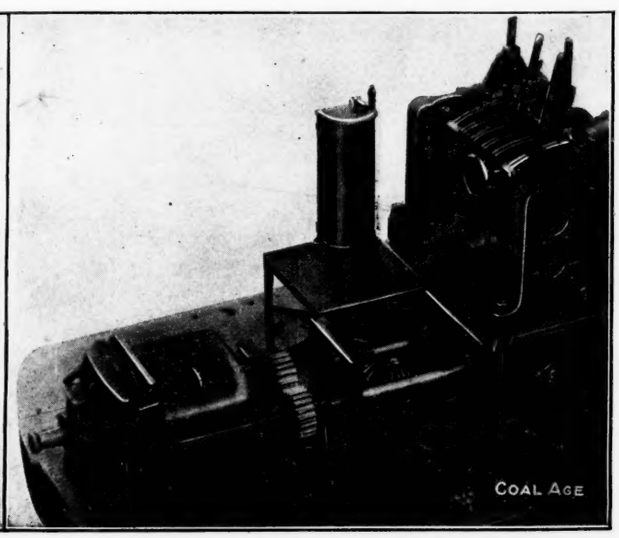
For all classes of direct-current machinery, generators and motors, there are a few simple rules which should always be observed.

In the first place, keep the commutator lubricated by using a very small quantity of vaseline applied with a cloth. If the commutator becomes rough, sandpaper moistened with oil may be used, running the machine at slow speed; or, if a piece of sandstone is available, hollow this out to fit the commutator and apply, moving it back and forth across the face of the commutator sideways until the surface becomes smooth. However, if the commutator is in bad shape, very rough, or out of true, it should be turned down. This can be done with the armature in its own bearings, using a special slide rest and running the machine slowly. After turning down the commutator, go over it carefully and remove any copper which may have lodged between the bars.

A good running commutator should present a dark, glossy appearance free from scratches. Too much attention cannot be paid to the commutator and brushes, for these are the vital parts of the machine, and their



A MINE PUMP GEARED TO A CONTINUOUS-CURRENT MOTOR

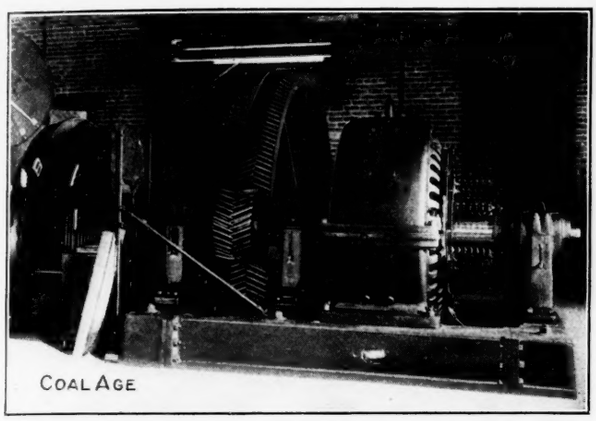


CONTINUOUS-CURRENT MOTOR AND CONTROLLER ON COAL-DOCK CRANE

perfect or imperfect condition in a central station is strong evidence of the competency or incompetency of the attendants. There is a certain knack in caring for a commutator, easily acquired by any careful, painstaking man, and a good point to remember is that prevention, not cure, is the best remedy for commutator trouble.

If properly installed and operated, most standard machines will run practically sparkless at all capacities up to a reasonable overload. Bad sparking would, therefore, indicate improper installation, lack of attention, or in rarer cases a mechanical defect that has developed after the machine has left the factory; whatever its cause, it should be investigated at once, as sparking is destructive to both commutator and brushes.

Sparking, when first starting a machine, may result from the following: Dirty commutator, improper fitting and spacing of brushes or insufficient tension upon them. The proper adjustment of brushes and holders will effectually overcome these faults.



A Continuous-Current Motor Driving a Mine Hoist

Position of Brushes with Respect to Field

The improper setting of brushes with respect to field coils will also produce sparking. Most armatures are so wound that brushes stand on line with the center of the polepiece, when on the neutral position. The best operating position will be found from three to six bars from the neutral, forward with rotation for a generator, and backward against rotation for a motor.

The brushes can be more accurately adjusted as follows: With machine running idle at normal voltage, shift as above mentioned, until very slight sparking is noticed under the edge of the brushes. If the lead obtained, after following these instructions, is too great, causing, in the case of a motor, greatly increased speeds, or in a generator, decreased voltage, an experienced man would then advise that the brushes be set to sparkless commutation at operating load. Sparking may appear after the machine has been in operation, from developments caused by lack of attention to any of the above details, also from roughened commutator, open circuit in armature windings, or from operation at other than normal voltage and load.

With belted machines see that the armature oscillates freely in its bearings while running under load, as this will greatly lengthen the life of the commutator and bearings.

Breaking a Field Circuit

Never break a field circuit suddenly, as the inductive discharge voltage is always many times higher than the operating voltage, and may puncture the insulation of the field. A discharge resistance should be used connected to a special field switch, which is ordinarily supplied with the larger machines.

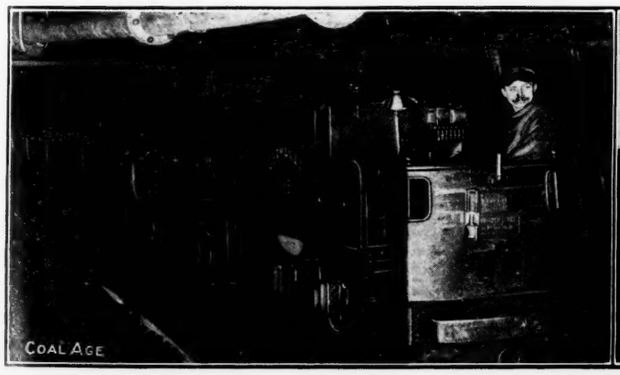
Do not open a switch on a circuit carrying a large amount of current. Trip the circuit-breaker first, then open the main switch.

See that all switches, circuit-breakers, etc., are open when the machine is not operating.

Always close the circuit-breaker first; then close the switch.

In case no protective device is used on the generator and trouble appears on the line, put all rheostat resistance in the circuit first, and then open the switch. Bearings should be given daily attention; nearly all bearing troubles are due to faults in operation rather than in design or manufacture. Some of the causes that lead to hot bearings are as follows: Poor grade of oil, grit and dust in oil well and bearings, foreign particles in oil grooves stopping circulation of oil, oil well not full, too tight or too heavy a belt, too much end thrust on armature, sprung shaft, babbitt worn down or badly cut, leaving a rough surface.

See that no bolts, nuts, screws, etc., are left around, as these may be drawn into the machine when its fields are excited and it is running. And in conclusion, upon all occasions, take care that direct-current generators or motors are kept clean, dry and free from dirt.



A Direct-Current Underground Locomotive

A Direct-Current Surface Locomotive

EDITORIALS

The Economical Combustion of Coal

In its relation to economy, the proper burning of coal for the production of power is of as great importance as its extraction from the bowels of the earth. The fuel item is one that often determines the success or failure of an industry. Hence, it is that the engineering features of modern boilerroom practice are attracting so much attention of late. The rise in the market price of coal has given fresh impetus to the investigation of the fuel question. The object sought in these investigations is to ascertain the particular features that increase the efficiency of the furnace in which the fuel is burned.

The efficiency engineer discovered some time ago that the supply of a sufficient amount of air (oxygen), per unit weight of coal burned, was not the only essential feature in the economical combustion of the fuel. He found that the element of time per unit weight of fuel burned, was also an important factor and one on which the real economy of the operation depends.

A given weight of coal burned in a given supply of air yields a known quantity of heat (B.t.u.), just as a given weight falling through a given vertical height performs a known work (ft.-lb.). But, just as the performance of a given work in a fixed time indicates the *power* employed, so the production of a given number of heat units (B.t.u.), in a fixed time, shows the energy developed and the efficiency of the combustion.

This reasoning, based on scientific knowledge, has led to important practical results. It is now well understood that, to produce the greatest efficiency in the combustion of fuel, for power purposes, the combustion must be rapid and take place at a high heat. By this means, the loss of heat from convection, conduction and radiation is reduced to a smaller percentage of the total heat developed, and the fuel itself is more completely burned.

In producing this combustion, the essential factors are: 1. To burn the coal under a high air pressure. 2. To utilize as large a percentage as possible of the heat generated by the combustion of the fuel, in the actual production of power. In the use of a high air pressure, say 4 or 5 in. of water gage, the fuel will often be blown from the grate. To avoid this difficulty, a balanced draft is necessary, which produces a differential effect, with the result that the combustion is maintained at a higher temperature and the fuel is more completely burned. Under these conditions, the furnace temperature is often extremely high—white hot.

The scheme is, after all, nothing less than an application of the old principle of a blacksmith's forge and a "hollow fire." The increased supply of oxygen produces a rapid and complete burning of the fuel at a high temperature. The heat of the combustion is greatly conserved by the type of furnace known as the "dutch-oven arch." To produce the best results, the air blast must be evenly distributed throughout the fuel bed.

A recent inspection of some steam plants, located in the vicinity of old culm piles and refuse-fuel heaps, reveals the fact that many of these plants are burning this refuse of earlier times, successfully. Such refuse now forms the chief fuel supply of many coal-mining plants where, formerly, the marketable sizes of coal were used. Such has been the increased market demand, in late years, for the smaller sizes of coal, for the production of power, that many coal-mining plants now depend wholly, for the production of their own power, on the refuse "dirt" of former years.

In the burning of anthracite dust, mine and washery refuse, etc., however, the use of a segment grate is necessary. Preferably, the construction is such as to reduce the air space to 5 per cent. of the grate area, or less. This segment grate is set in a dutch-oven furnace; and a high air pressure of 4 or 5 in. of water gage is used with a balanced draft in the furnace to prevent the fine fuel from being blown away. In the sharp competition, at the present time, it is more than ever necessary to employ every means to increase the economy of operation.

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The Pneumatic Signaling System in Mines

The importance of a good signal system at shaft and slope mines has often failed to receive the attention it deserves, until some incident has occurred to reveal the inadequacy of the signal system in use. The common method formerly employed for transmitting signals between the engine room and the shaft or slope bottom, or from the mine opening to the inside workings was that by which a gong was sounded by pulling a wire, or by making an electrical connection through a wire conductor.

The defects and petty annoyances arising from these systems are numerous. Wires are broken, or false signals are given by falling material coming in contact with the wire; or by someone meddling with the wire by which the signal is transmitted. The spirit of mischief, always prevalent among irresponsible men and boys in mines, has resulted, in some instances, in serious accident due to the meddling with signal wires, which is possible in both of the old systems of signaling.

Much annoyance is also caused by the corrosion of the wires and connections. There is always the possibility also, that the proper signal may fail of transmission at one or more points, which would prove a source of danger. Interruptions are at times caused by the freezing tight of the wires, or the short-circuiting of the electric current, at intermediate points.

The pneumatic signaling system is devoid of all these defects and possesses the further advantage that the pipe line through which the signals are transmitted can be made to serve as a speaking tube. The system permits of no interruption or meddling at intermediate points except as the pipe line may be broken by a heavy fall. A pneumatic system of signals properly installed is practically free from any expense for maintenance, during the life of the mine. One of its chief advantages is the

fact that it cannot get out of order through disuse; but is always ready when required, after a season of idleness. At such times, an electric system of signaling requires much attention to again put it in shape for use. The pneumatic system is also more exempt from damage in case of fire than either of the other systems of signaling.

The pneumatic system is in use in many of the mines of the Lehigh Valley Coal Co., and it is stated that the Delaware & Hudson Coal Co. have recently decided to install this system in their mines. The same system is in use in the mines of the Oliver & Snyder Steel Co. and in a number of mines throughout the West.

The Public Coal Lands of the West

It is always a mistake to permit a misstatement of facts to occur in the defense of a good cause, one which is so assured of ultimate success that only mistaken advocacy can delay it. It is with this spirit that we view and regret the errors pointed out by George O. Smith and G. H. Ashley in the letters we print today.

And it is strange to note when reading those letters that with the peculiar vertigo which blinds and weakens all controversialists, Mr. Ashley has made a misstatement in rebuttal which he would doubtless be as pleased to correct as we are to admit our own errors in fact. No hunting musty files of governmental reports will be needed, simply a reference to our issue of Nov. 1, which was before him when he wrote the letter in question.

Mr. Ashley quotes us as saying that the Geological Survey sells coal lands. If he will read again carefully he will light upon the word "indirectly," which he completely overlooked in his quotation. This adverb was not thrust in without intention but with the somewhat insane idea that it was necessary to prevent the subscriber and proof reader from thinking for one unreflecting minute that we thought the Survey really did sell lands of any kind. We could hardly believe that our readers would think us guilty of such a misapprehension of one of the best known facts of civics, but we put the word in the sentence to make assurance doubly sure.

But to show how correct the sentence is as printed when we said that "Mr. Smith has indirectly the selling of the patrimony of a nation"; we wish to call attention to one interesting fact. The Land Office in making its yearly report says but little about coal-land sales except to total their distribution, number, acreage and value since 1873, but the director of the Geological Survey tells us how the sales compare now with those before the year 1907 and gives the number of acres sold at each price since that date.

Of course, the Survey does not sell land, it only names the price. If an individual could only do that, he could sell Scranton, Pittsburgh or New York City within six months if he made the price low enough.

In accepting the statements of Mr. Smith and Mr. Ashley, we must specifically object to forming an opinion on the amount sold under the new *régime* until we are told how much of the coal land sold since July 1, 1907, has been classified by the department and how much has been sold before withdrawal or at prices below rates appraised, as is customary when lands have been filed, on or before such withdrawal.

Moreover, we may be excused for wishing personally to know that the 905 sales made represent 905 conveyances to separate individuals and associations and not sales at different prices to a fewer number of such persons, actual or constructive. We are moved to make this inquiry because we find that the conveyance of the square-mile sale is not reported in the 1911-1912 report of the Geological Survey, for the land sold under any one price above $50 per acre does not amount to any such acreage. This sale was apparently entered under several separate price items, which method is not an incorrect one but such as obviously increases the number of entries, as some of them may be thereby made as low as 40 acres.

The Western coal-land question is of great interest and we expect to give it in the future more editorial space. In some matters we shall doubtless find ourselves in sympathy with the Geological Survey, though in many matters we are wholly at variance. Some of their difficulties are those of all geologists and they are merely conspicuous victims of their profession. The ascertainment of even surface-land values is an economic question of difficulty and the relation of coal value to location is of similar uncertainty. When to that problem is added all the geologic irregularities of the Western coal lands, the strain approaches the breaking point.

By putting the lands at an unsalable figure, the coal will remain in the ground so that no public officer will be condemned for giving coal land away for a questionable purpose or accused of enriching an individual at the public expense. The position of a governmental officer in these days of public scandals is not an enviable one. But the people must be served rightly even despite the threat of the muckraker. The public wealth must not be monopolized by the government merely because its officers fear that, otherwise, they might in some cases enrich an individual. Such governmental caution as we too often see resembles the fears of the miser.

Protection That Does Not Protect

The developments of the past week, in Scranton, remind one of a game of hide and seek. We refer to the peculiar situation growing out of the recent investigations undertaken by the Scranton Protective Association, in the interest of property holders; and the work of the Mine Cave Commission, authorized by the Davis Mine Cave law, which passed the assembly and was signed by Governor Tener, July 28, 1913.

The question of surface support, in Scranton, has assumed the aspect of a three-cornered fight between the resident property holders, the city officials responsible for the enforcement of law and the protection of the lives of citizens, and the coal companies operating the mines underlying portions of the city.

The Mine Cave Commission has been severely criticized for its seeming inactivity during the past three months. The report made to the city council Nov. 14, however, is a vigorous arraignment of the director of public safety and incidentally, also, of the city solicitor, to whose evasive methods the commissioners ascribe the delay in the enforcement of the law. So strong was the evidence presented by the commissioners that the city fathers have now asked Director Terwilliger for an explanation of his failure to act on the reported violations of the law.

The amusing feature in the situation, which has reached a white heat, in Scranton, is the absence from the city,

on a hunting expedition, of both the director of public safety and City Solicitor Davis. It might be appropriate to ask: Why are these two much needed officials more absorbed in their own pastime and enjoyment than in the faithful prosecution of the work entrusted to their care? Is the hunting of game of greater moment than the protection of the city's interests, at a time when law is being violated?

All interests are now looking forward hopefully to the coming of President Truesdale to Scranton to confer on the question so important to the business interests of the city. The Lackawanna president can be expected to evolve a scheme that will bring relief and make the people of Scranton proud of the Anthracite Road.

Effect of New Tariff Law on Coal Business

"Largely sentimental" is the way New England views the effect of the new tariff law on the coal business. The reduction of the old rate of 67c. to the 45c. imposed by the Payne-Aldrich law of 1910 was of negligible effect, and the placing of bituminous on the free list now is hardly likely to attract any materially increased tonnage from foreign ports. What foreign coal comes to New England is almost exclusively from Louisburg, Cape Breton, and while in ten years the consumption of American soft coal has steadily increased in our north Atlantic states at the rate of several hundred thousand tons a year, the receipts of provincial coals have in the main grown steadily less.

Portland and Boston are the only centers where Cape Breton coal is imported in any quantity, and in 1912 at Boston the entire tonnage received was only slightly over 300,000, or less than 7 per cent. of the total by water. The answer is that Dominion coal is relatively so inferior and withal so expensive to put on the market, that even duty-free, the outlet for it here is bound to continue narrow, and restricted to special instances.

For several years the Cape Breton coal entered at Boston has been exclusively for one of the large gas-producing companies, under an old and long-term contract, and the smaller and smaller amounts taken from Louisburg is due to the larger tonnages received each year from West Virginia. Buyers have been so liberally educated in heating values the last few years, that there is less and less interest in prices alone; there is now a broad discrimination against fuels that are high in ash or low in fusing temperature, and the differential between "poor" and "good" is each year an increasing one. On quality, then, there is little chance of any influx of provincial coal, and quality as a factor will probably more than offset the elimination of the 45c. duty.

From Great Britain, the only remaining possible source of supply, receipts of coal since 1903 have been practically nil, and doubtless they will remain so, at least under ordinary circumstances. Ocean freights, the cost of mining, and a normal market at home are of themselves sufficient to keep British shippers from ventures in this direction.

Indeed, it is not as if "free coal" were an untried experiment. Jan. 15, 1903, by special act of Congress, called forth by distress in the big cities on the Atlantic seaboard as a result of the great strike in Pennsylvania, coal was admitted free for one year, and had it not been for the attempt of the Hampton Roads agencies that season to get an abnormally high price for their West Virginia output, there would have been much less imported coal than was the case.

On Apr. 1, 1903, the f.o.b. price of Pocahontas and New River coals was "established" at $3.35, a price 50c. higher than the high season price of ten years later, and two or three of the largest corporations who refused to pay it were found later with Cardiff steamers alongside. Needless to say, the Hampton Roads price soon dropped to $2.50@2.60, then a normal figure. The statistics of the port of Boston show that there were practically no imports of British coal after May, 1903.

That episode was, of course, a special case, and British coals and freights have since advanced along with American prices and rates, and the increasing coal traffic overseas is from here across, to points that were formerly supplied from England, and not from England here. American coal, therefore, needs no more protection than nature and geographical position themselves afford, so far as concerns our northeastern states, and "free coal" as a boon to New England is rather like a soft word—it costs very little and does no one any harm.

Of the indirect effect of the tariff on coal mining, through the manufacturing industries, there are different opinions. It may be there will be a halt to the expansion that has gone on so fast during the past decade or two, but it is hardly expected that the consumption of bituminous, in the aggregate, will decrease.

There is caution now in most directions, particularly among textile people, but once adjusted to the new schedules and policies and with the money market more settled, there is small reason for thinking 1914 will be any but a flourishing year for soft coal in the United States. It is only indirectly that any slump is likely to come, and representative opinion does not countenance such a possibility. Certainly on neither ground, inroads by foreign shippers nor through industrial depression, is there liable to be any serious upset in the present course of the coal business in New England or elsewhere.

Recent Legal Decisions

By A. L. H. Street*

Adjustment of Coal-Land Transaction—Plaintiff, having accepted repayment of advances made by him in the purchase of coal lands, in lieu of an interest in the lands, to recover which he had sued, was precluded from afterward suing to recover an interest in the land. (United States Circuit Court of Appeals, Fourth Circuit; Coal & Coke Ry. Co. vs. Nease; 207 Federal Reporter 237.)

Liability for Demurrage—When a vessel is chartered to carry a cargo of coal and is directed to report at a certain coal company's docks for loading, the charterer becomes liable for demurrage incurred because of the company's failure to give customary dispatch in loading. (United States District Court, District of Maine; Carleton vs. Three Hundred Sixty-seven Tons of Coal; 206 Federal Reporter 345.)

Duty to Instruct Inexperienced Employee—The rule of law which requires an employer to warn an inexperienced employee against the dangers which are incident to the work to which he is assigned is not limited to minor employees, and extends to adults. (Pennsylvania Supreme Court, Zeskie vs. Pennsylvania Coal Co., 88 Atlantic Reporter 414.)

Duty to Furnish Miners' Props—A Kentucky mine operator is liable for injury to a miner resulting from failure to furnish him roof props on request, as required by statute, unless the danger was so imminent that a reasonably prudent miner would not have remained at work under the circumstances. (Kentucky Court of Appeals, Left Fork Coal Co. vs. Owens' Administratrix, 159 Southwestern Reporter 703.)

*Attorney-at-Law, St. Paul, Minn.

SOCIOLOGICAL DEPARTMENT

The Use of Injectors on Breathing Apparatus

SYNOPSIS—Answers are given to Prof. John Cadman's assertion that injectors are dangerous in breathing apparatus. German authorities declare that there is no ground for favoring breathing appliances in which the injector is omitted. Just as steam operates a boiler inspirator by its passage through a tapered orifice, so the oxygen escaping from its cylinder draws air through the injector of breathing equipment. The injector draws from the bag containing exhaled air and tends to cause a slight vacuum, which is increased by the absorption of carbon dioxide by the potash in the alkali cartridge. If the bag is punctured or its connections leak, carbon monoxide may be drawn in. To avoid this, new apparatus provide that the pressure shall, in all parts of the device, be greater than atmospheric and that the air circulation shall take place at increased pressure in the lungs. Care to hold air in the lungs when putting on the helmet will also aid in preventing such unduly low exhalation-bag pressures.

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COAL AGE has already published some items (Vol. 3, page 718) about the danger alleged by Prof. John Cadman, of Birmingham, England, to be attendant upon the use of injectors with breathing apparatus. His views received much attention in the papers at the International Congress on Rescue Work and Accident Prevention, held at Vienna, Austria, September, 1913. It may be worth while to present the following notes, translated from abstracts in the "Montanistische Rundschau." The first is from a paper by Doctor Fortsmann, mining assessor and manager at the rescue-work headquarters in the Rhenish-Westphalian coal-mining district:

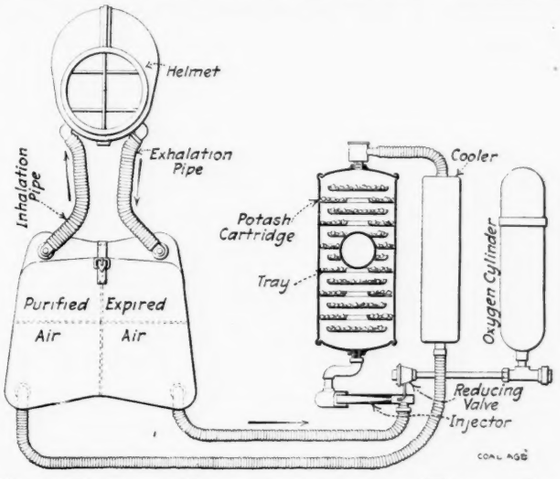
PRESSURES LOWER THAN THAT OF THE ATMOSPHERE

"Professor Cadman, of Birmingham, has, in recent years, determined that pressures below atmospheric in breathing apparatus equipped with injectors may occur and, in case of leaks, be dangerous to the wearer. He therefore discourages the use of injectors on such apparatus. It has long been well known to us that such low pressures occur and are a source of some danger. Nevertheless, in Germany, the introduction of injectors is regarded as essentially progressive, and the danger is met by abundant warnings to the rescue crew of the danger of leaks, together with careful tests immediately before putting on the apparatus. The publications by Professor Cadman have caused the Rhenish-Westphalian rescue headquarters to make extensive experiments concerning the magnitude of its danger. These tests have resulted as follows:

"The degree of the low pressure occurring in breathing apparatus varies within wide limits. It depends upon:

1. The adjustment of the blow-off valve;
2. The degree of depression produced by the automatic;
3. Whether the breathing bag is completely filled with air or not.

"The quantity of outer air entering the breathing apparatus through a leak is dependent upon these factors, as well as upon the size of the opening. With large leaks the penetrating air may become dangerous if it contain poisonous gases. Such leaks can, however, be determined even by a cursory test with the depression meter. For small leaks (through orifices of 0.08 in. diameter), the man with the depression meter can also determine, if he makes the test carefully, whether under normal conditions so much outer air does not, at least in case of great exertion, enter the breathing apparatus as to endanger the life of its wearer.



NEW MODEL OF DRAEGER APPARATUS WHICH FORCES AIR AND OXYGEN THROUGH POTASH CARTRIDGE. DRAWING AIR THROUGH THE RESISTANT POTASH CYLINDER MAY SOMETIMES CAUSE MINE GAS TO BE SUCKED THROUGH LEAKS

APPARATUS WITH INJECTORS IS OF PROVED VALUE

"According to this, the opinion expressed against injectors is exaggerated, and there is no ground for preferring injectorless breathing apparatus, with which much less work can be accomplished."

The other paper which treats of this subject is by Mining Assessor Grahn, instructor in the mining school at Bochum, and manager of rescue work for a Westphalian mining association:

"Oxygen breathing apparatus with injectors, as in particular that of the Draeger Works, of Luebeck, the Westfalia Co., in Gelsenkirchen, and the Mining Engineering Co., Ltd., in Sheffield, England, has been used for a number of years in most mining districts and in related industries, the results generally being excellent. At the Bochum mining school, for 12 years past, all pupils and often mining officials also, have been in-

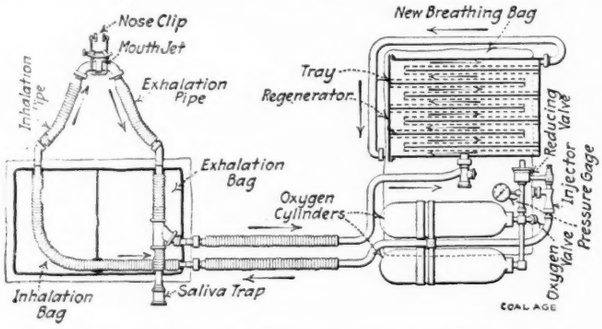
Note—Translated for "Coal Age" by E. F. Buffet.

structed in the use of breathing apparatus with injectors. For as long a time such apparatus have been kept for the use of the mines in the district in case of emergency.

"Such disasters as that in an English coal mine, at Swansea, mentioned by Professor Cadman, which was attributed to mine air containing carbon monoxide, which had been sucked into the apparatus as a result of injury to the regenerator, have not so far, to my knowledge, been observed in the Rhenish-Westphalian industrial district.

Importance of Testing

Breathing apparatus which have not been duly filled before the beginning of breathing and carefully tested for



Modification of Westfalia Apparatus with an Additional Breathing Bag Carried on Back to Avoid Pressures Lower than Atmospheric

tightness and efficient working of the automatic, have indeed, in individual cases, where improperly used, led to accidents, especially to carbon-monoxide poisoning.

The fact determined by Professor Cadman that low pressures occur in injector breathing apparatus and, if leaks be present, may admit air from outside, is correct and has been observed since this apparatus has been in use.

According to my determinations, the depth of depression can amount under especially favorable conditions, to 3.2 in. of the water column.

What quantities of outside air may be sucked into breathing apparatus through leaks of determined size under certain conditions, is a subject extensively investigated by Doctor Forstmann, in Essen, and more fully reported in his address. According to this, it appears almost impossible that the rescue man can be endangered in gases of combustion with an ordinary carbon-monoxide content of not more than 1 per cent., when the cross-section of the leak does not exceed 3 or 4 sq.mm. (0.0047 to 0.0062 sq.in.).

Pressure Provided Equal to or Greater Than Atmospheric

To meet objections that have been raised in many quarters on the ground of the foregoing facts, the firms named which manufacture breathing apparatus are making, where desired, the following changes or improvements:

(a) The Draeger Works, in Luebeck, let the injector on its 1910-1911 model blow the exhaled air through the regenerator instead of arranging it so as to suck the expired air through as formerly.

(b) The Westfalia Co. and the Mining Engineering Co. furnish with the previous 1912 model, a second large breathing bag to be carried on the back and connected in the circuit of the air behind the regenerator. The bag is furnished inside with weak rubber bands so that it contracts as soon as the ordinary pressure in the apparatus falls. The relief valve of the exhalation bag is set so as to blow off at a higher pressure than before, namely, 4 in. water column. Of the alterations just mentioned, I have hitherto been able to test only that of the Westfalia in the trial room of the mining school.

These experiments have proved that, if the apparatus be properly used, these changes prevent low pressure better than the old plan. I have in view to make further tests, with the Westfalia and Draeger apparatus, and I expect to report upon them to a meeting of this congress.

For the use of injector breathing apparatus of the old and new designs, in case of emergency, the following rules are most important to follow, hereafter as heretofore:

(a) The apparatus before using is to be subjected by the well known methods to very careful testing, especially for tightness; (b) The entire apparatus, and especially the breathing bag, must be filled with air before the rescue man exerts himself; (c) During use, the apparatus is to be constantly watched by the leader.

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Underground First-Aid Stations

By Joseph Daniels*

The Northwestern Improvement Co., operating coal mines in Montana and Washington, has taken an active lead in adopting safety measures and appliances and in organizing and training its officials and men into efficient rescue and first-aid units. Examples of some of the underground first-aid stations in the mines of the Roslyn field are shown in the illustrations.

Fig. 2 shows a station at the intersection of a manway and entry in No. 5 mine. Part of the wooden stopping is used for a door and the rest carries a first-aid box mounted in a wooden frame which is illuminated by five 32-cp. lamps. The wooden frame is 2 ft. 6 in. long, 2 ft. wide, and 6 in. deep, made of inch boards and lined with an asbestos back. The bottom of the box forms a shelf on which may be placed any supplemental articles, such as bottles of picric acid. The stoppings and the walls are all whitewashed. No man in the mine can fail to know where to go in case of emergency, and there is always sufficient light by which to work. Fig. 1 shows details of the station box.

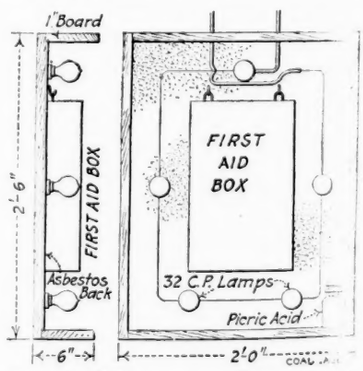

Fig. 1. Manner of Installing First-Aid Box in Roslyn Mine

Another form of station is shown in Fig. 3. This is cut in the coal and roof rock on the entry at the partings, and is about 12 ft. long and 6 ft. high and lined with wood and then whitewashed. In addition to the first-aid box already described, a roll of blankets carried in a closed

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sheet-metal tube or frame 5 ft. long, 10 in. in diameter, is suspended on a pair of hangers. A stretcher, also carried in a metal tube which is 8 ft. long and 7 in. in diameter, is similarly carried by hooks. These metal tubes are either of galvanized or ordinary iron painted black and have a large red cross marked on them. A complete assortment of splints rests on the tubes. These stations are being installed throughout the various mines of the field.

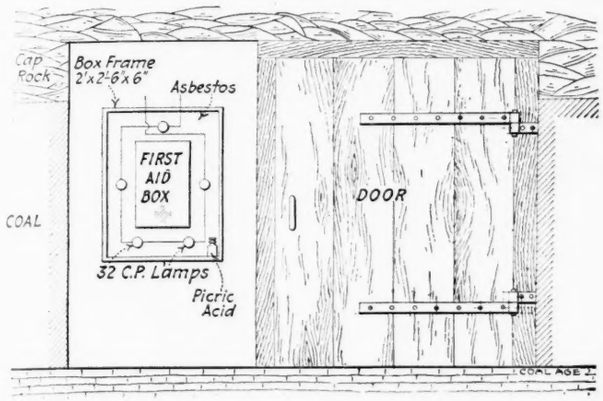

FIG. 2. STATION AT INTERSECTION OF MANWAY AND ENTRY NO. 5 MINE

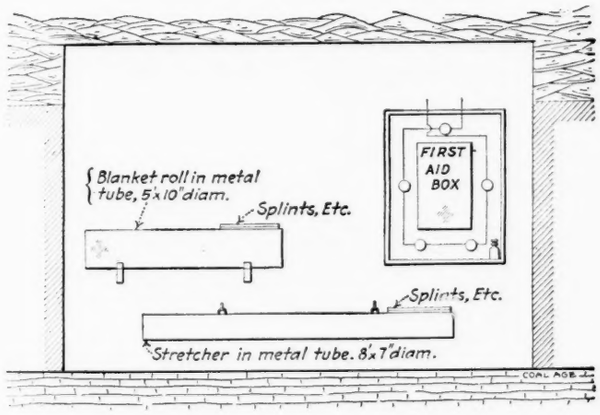

FIG. 3. FRONT AND REAR WALLS OF RESCUE STATION

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Training for Rescue Work

The Bureau of Mines has kept in mind the fact that there is a broad gap between theory and practice, and has inaugurated a series of practical maneuvers in the mine of the Consolidation Coal Co., at Chiefton, eight miles south of Fairmont, W. Va. In this mine, the conditions of an explosion are imitated and a rescue drill is practiced.

In all, 24 teams of 5 men each will be put through their paces by the men in charge of car No. 6, now stationed at No. 72 or the Chiefton mine. One of the company tenements has been formed into a rescue station, one room being devoted to first-aid equipment and the second to helmets and pulmotors. The upstairs apartments are used as changerooms for the teams which will be trained.

Near the entrance to the mine, a smokehouse has been built for testing the apparatus in formaldehyde gas in order to find whether there are any leaks before venturing into the mine. A blind entry off the main heading directly inside the entrance has been equipped as an underground emergency hospital.

The door leading to the smoke area which is to be used in training work, is 350 to 450 ft. in, along the main haulway. The area consists of 3 rooms and 3 side entries closed off by stoppings and brattice cloth. In case the apparatus of any of the men should fail, a fan furnishing 25,000 cu.ft. of air per min. can clear out the smoke in from 3 to 5 min. Thus there is no risk accompanying these drills.

There is to be, as usual, some spectacular work. The bureau is convinced that the interest of the people, and above all that of the wives and the co-laborers of the miners and others engaged, should be aroused. Consequently electric lights have been strung in the main roadway and window sashes have been placed in the trap doors. The roads leading to the smoke area have been made clean for visitors, so that anyone can go in the mine and watch the work without having his clothes soiled.

Two teams will undergo training each week. They will be taught not only rescue work but first aid, a syllabus of 24 first-aid and 6 rescue events being provided for instruction and practice. C. O. Roberts is first-aid instructor and E. Steidle is foreman in charge of the car. The names of the companies presenting teams for training are given in our issue of Oct. 4, p. 502.

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The Human Factor in Welfare Work

The success of the work of all welfare organizations, such as that at Decota, W. Va., is not so much in the elaboration of details, or even in its response to the actual needs of the people affected as in its *mutuality*. At the Y. M. C. A., built by the Carbon Coal Co. and described in our issue of Nov. 15, every effort is made to enable the employees to feel that the enterprise is their own and depends on their efforts for its proper support.

The management of the coal companies has never interfered with the association policies, but has left the entire management of its affairs in the hands of the men and the trained secretary. The company gives liberally to the support of the work and feels that it is a good investment. The men are also liberal in their patronage for they know that any surplus revenue, instead of going to the company or to the pocket of any private person, will be used by themselves in an extension of their own enterprise. The success of such an undertaking depends largely on the selection of the right person to be the leader. He must have had the training which will give him the correct perspective; he must know the value of the human personality; he must be able to sympathize with human weakness and know how to develop the best in each of his men.

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The Colorado Fuel & Iron Co. employs a rather novel method for humidifying mine air. A radiator is placed on both sides of the heading through which the entering air passes. The waste steam from the radiator is conducted to a perforated pipe to which is attached a curtain of burlap or brattice cloth. The purpose of the burlap is to bring the condensed steam in contact with the air current. As the air pases over the radiator it is heated and its capacity to pick up moisture is greatly increased. It then strikes the saturated curtains and absorbs the moisture.

DISCUSSION BY READERS

Starting Fan after Explosion

Letter No. 8—Referring to the recent discussion of this subject, I want to say that the question of whether a fan should or should not be started, after a brief idleness because of being damaged by the explosion, is a difficult question to answer directly; because the conditions vary so much, in all accidents of this kind.

In my mining experience of 57 years, I have had much to do with gas and have witnessed many serious explosions. I was in Bryndu colliery, near Pyle, South Wales, when the explosion took place there, in 1858, that killed every man in the split of air in which it occurred. In 1862, I was at the Park Shaft colliery, Briton Ferry, South Wales, when an explosion took place that killed every man on the east side of the mine, which was ventilated by a separate air split. In 1867, I was at the Ferndale colliery, South Wales, when all the men on the east side of that mine were killed by an explosion. The two mines last mentioned were ventilated by furnaces, which were the only means of producing the circulation of air through these mines.

If we assume an explosion takes place in a gaseous mine ventilated in five or six separate splits or air currents, it may happen that this will be wholly confined to the one split in which it occurred; or, if the explosion is assisted by accumulations of dust and more or less gas distributed throughout the mine, all of the splits may be affected alike, the explosion being general. In that case, the force developed would probably be sufficient to damage the fan, which would have to be stopped for repairs. It is natural, then, to imagine that the main entries and roadways would be blocked by numerous caves or falls of roof.

Under these conditions, it is certainly a difficult problem to decide upon the best thing to be done. There are, probably, many men still living in the mine and many who have been killed by the blast or buried beneath the falls. Moreover, fires may have been started in different parts of the mine. As has been stated before, in this discussion, the fires would produce more or less circulation of air through the mine and endanger the men who are still alive, as much as would result from starting the fan. On the other hand, if no fires exist in the mine and there is no circulation of air, the accumulations of gas in the workings will endanger the men still alive and entombed therein. In a gaseous mine, there is, of course, the danger, in starting the fan after a brief idleness, of driving accumulated gas into a fire area and causing another explosion, with the possibility of a greater loss of life even than before.

In the face of these numerous difficulties, it frequently happens that good use can be made of the mine-rescue corps, wearing helmets or other breathing apparatus. It may be possible, by this means, to penetrate the inner workings and obtain information of the condition of the mine and rescue many survivors. Whenever this is possible, it is certainly the best thing to be done; but this system has not as yet, in my opinion, been fully developed and is often ineffective, except where the circumstances are peculiarly favorable.

Where the explosion in a gaseous mine has affected one split only, there is grave danger in allowing the fan to remain idle for any length of time, which would permit the accumulation of large bodies of gas in the other splits. In this case, the fan should be put in operation as quickly as possible, and steps taken to confine the circulation of air to those splits not affected by the explosion.

W. D. OWENS, Div. Supt.,
Lehigh Valley Coal Co.

Pittston, Penn.

The Certificate Law

Letter No. 2—The question of a universal certificate law seems to be attracting the attention of mining men to a considerable extent, at the present time. As has been suggested, an intelligent exchange of views and opinions on the question will not only be interesting, but cannot fail to secure a better adjustment of the matter.

The remark was made by Mr. Dixon, COAL AGE, Oct. 25, p. 604, that it would be a wise provision if each coal-mining state would pass a law, making the holders of a duly authorized certificate of competency in another state eligible to like office in that state also. He argues that: "Such a law would encourage the interchange of intelligent mining men and * * * * * provide a means by which ambitious young men could obtain a wider experience and increase their competency."

I am of the opinion that nothing would be gained by the enactment of such a law; and that the present condition has a greater tendency to stimulate ambitious young men to study and increase their competency and gain a wider experience than the proposed change could effect.

It appears to me that it would be a difficult proposition for the different states to enact laws that would be sufficiently universal in their application to the various conditions and requirements existing in different coal fields. Some states are more progressive and further advanced in their mining laws, and require a higher degree of proficiency in candidates for the position of mine foremen than is the case in other states.

Under the present system of examination, each state maintains its own standard and coal operators do not suffer by the employment of mine foremen who have been examined and certificated by a board in another state where the requirements are not as severe. The adoption of such a universal system of certification would, I believe, tend to endanger the lives of miners by increasing the migration of irresponsible foremen of limited training and experience, and by the employment of foremen who are not fully acquainted with local conditions.

The matter of standardizing examinations in different states, as conducted by different examining boards, would be another difficult proposition. No two examining boards mark alike, and the grading of candidates in examination

would depend as much on the intelligence of the examiners as upon the replies of the candidates. It should be no great burden or task for a mine foreman holding a certificate of competency in one state, to secure a like certificate in another state, if he is capable of meeting the requirements made necessary by the different conditions in the other state. On the other hand, it would be an incentive to the candidate to further study and the acquirement of greater knowledge.

It goes without saying that the examination in different states must conform to the conditions of mining and the standard of proficiency required in each case. It is also true that the mining industry is progressing, and it is necessary that the standard of examinations must advance at the same rate, in order that only capable and efficient miners be awarded certificates of competency. It does not follow that a miner who is qualified and competent to discharge the duties of mine foreman in one mining district or state is like qualified or competent to discharge the same duties in another district or state where the conditions are more complex.

It is my belief that the coal-mining industry of the country can be best promoted, and the safety of miners best conserved, by each state enacting laws regulating the mining of coal in its own territory. I believe that a certificate of competency to act as mine foreman should be good only in the state where it is granted, and that no certificate of competency should be issued for a longer period than six years.

It is too often the case that a candidate will prepare for examination by studying diligently for a few weeks previous to going before the board; and when the examination is over and the certificate granted, all further study is dropped. If, however, the candidate knew that he was required to pass another examination in a few years, again, he would keep up his study and interest, and his mining knowledge would increase. It is enough to convince any reasonable mining man of the absurdity of granting certificates of competency for an indefinite period or making those certificates good in all states, when we observe the number of mine foremen who read no mining journals or make any systematic effort to acquire more mining knowledge. There are many such foremen in all mining camps.

Having been a member of the new examining board, referred to by U. S. Wilson, COAL AGE, Nov. 8, p. 710, I am familiar with the incident he narrates of a man holding a second-class or "Class B" certificate granted by a previous examining board in Tennessee, failing to pass an examination for a first-class or "Class A" certificate, or even to receive a sufficient average to entitle him to the "Class B" certificate which he already held. I want to say that the failure of that man to secure the necessary mark in the second examination before the new board was due to no fault or unfairness of either examining boards; but can be attributed to the fact that after receiving his "Class B" certificate, in the first examination, he neglected further study of the methods and systems of mining and, as a consequence, instead of advancing in knowledge and experience, he retrograded to that extent that his present knowledge and qualifications would not warrant the granting of a "Class B" certificate.

This incident is only one of many I could mention in support of my argument, that certificates of competency should be frequently renewed. I believe in a progressive system that will keep men studying methods of safety, means of sanitation and plans of producing coal, and that will stimulate them with an ambition to make better mine foremen. There is the same demand for raising the standard of competency in mining that there is in teaching school. As systems of education have changed and the required standard has been raised, so mining operations are conducted upon new and improved methods, and require a higher degree of proficiency in mine foremen than was required a few years ago.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

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Letter No. 3—The question raised by Mr. Dixon, COAL AGE, Oct. 25, p. 604, in regard to making mine-foreman certificates good in all coal-mining states, is an interesting one. It is quite true that, previous to the certificate law being enacted, a competent man could secure a position to act as mine foreman in any district or state where he might chance to go, without being required to pass an examination to prove his competency.

I do not wish to detract one iota from the importance of the certification of mine foremen, as, in my opinion, every official connected with mining, in an active capacity, should be required to pass an examination, from the mine manager down to the shotfirer. I would urge that such examinations be required in every coal-mining state. The certificates should be graded, and a percentage of efficiency required in accordance with the importance and responsibility of the position desired by the candidate.

On the other hand, while I believe in the examination of candidates for mine foremanship, in each state, it does not seem to me fair to require a man of experience to serve another apprenticeship in mining when he migrates to another state. In my opinion, the mining laws of the state should not require that a candidate for mine-foreman certificate should have a specified number of years' experience in the coal mines of that state. Where such period of apprenticeship is required by law, as in the case of the bituminous mining law of Pennsylvania (Art. 24, Sec. 4), or the coal-mining laws of Colorado (Sec. 40), the law should be so amended as to eliminate this requirement. The bituminous law of Pennsylvania requires an apprenticeship of five years and the coal-mining laws of Colorado demand a similar apprenticeship of two years, before a candidate is eligible and can be granted a certificate of competency to act as mine foreman. I believe the eligibility of a candidate should depend solely upon his competency as determined by an examination in the state where he desires to serve as mine foreman.

It cannot be denied that the different coal fields present conditions that vary widely in their requirements, in respect to the safe and economical extraction of the underlying coal. But, after all, the principles involved in the operations of mining are very much the same; and a man who has proved his competency in examination before a properly constituted examining board, should not require more than one or two years of service as assistant mine foreman, in the state, to make him eligible to the higher position of foreman.

In my opinion, Mr. Dixon's suggestion of a universal certificate of competency would have a tendency to lower the standard, not only because the holder of such a certificate would feel he could hold the same position in any

state; but, because it would authorize the employment of many mine foremen under conditions with which they are totally unfamiliar. It would remove the stimulus for study and improvement. While the incident cited by Mr. Wilson, COAL AGE, Nov. 8, p. 710, where mine foremen operating adjoining mines on the border line of Kentucky and Tennessee could not cross the state line and occupy the same position, presents a somewhat aggravating condition, it may prove a necessary requirement in other mines and districts of these states; and, as a law, it shoud be strictly enforced.

J. E. AMBROSE.

New Durham, N. J.

Collapsible Stoppings

Letter No. 10—To speak of "collapsible stoppings," in reference to mines, is quite indefinite, and the question has well been asked: "What is a collapsible stopping?" Most of the stoppings as built at the present time may be classed under that head, as in few instances only, would they withstand the force of an explosion.

While it would certainly be an expensive proposition to build all main stoppings of a noncollapsible type, yet I am heartily in favor of building the stoppings on the main heading in a substantial manner, so that they will be capable of withstanding the shock due to an ordinary local explosion. I believe this is especially necessary where gas and dust are met in dangerous quantities in the workings. It is as important that the stoppings should be in place after an explosion, as before, in order that the ventilating current shall take its true course. I venture the opinion that more lives will be saved where the stoppings have withstood an explosion and remained intact, than where they have been blown out by the force of the blast. In the former case, the ventilating current will again resume its regular course, while, in the latter case, the ventilation in the workings would be deranged and the accumulation of gas that would result would make possible a second explosion and further loss of life.

In regard to gaseous and dusty mines, the main point to be considered in the ventilation of the mine is to divide the workings into separate ventilation districts or panels, and to leave a sufficient barrier of coal between the several panels. Where this system is adopted, an explosion of gas in one panel will generally be confined to the district in which it occurred. The air current in the other districts, or panels, would not be vitiated as a result of the explosion, and the situation is more easily handled immediately following the explosion.

JOHN E. SPICER.

Cumberland, B. C., Canada.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

TABLE SHOWING SATURATED-VAPOR PRESSURES FOR DIFFERENT TEMPERATURES

Degrees, Fahr.	Barometric Pressure, Mercury (32° F.) In.	Pressure, Pounds per Square Inch	Degrees, Fahr.	Barometric Pressure, Mercury (32° F.) In.	Pressure, Pounds per Square Inch
−30	.0099	.0049	70	.7335	.3602
−20	.0168	.0082	71	.7587	.3726
−10	.0276	.0136	72	.7848	.3854
0	.0439	.0216	73	.8116	.3986
5	.0551	.0271	74	.8393	.4122
10	.0691	.0339	75	.8678	.4262
15	.0865	.0425	76	.8972	.4406
20	.1074	.0527	77	.9275	.4555
26	.1397	.0686	78	.9587	.4708
32	.1815	.0891	79	.9906	.4865
34	.1961	.0963	80	1.024	.5027
36	.2122	.1042	81	1.058	.5194
37	.2205	.1083	82	1.092	.5365
38	.2293	.1126	83	1.128	.5542
39	.2382	.1170	84	1.165	.5723
40	.2476	.1216	85	1.203	.5910
41	.2574	.1264	86	1.243	.6102
42	.2674	.1313	87	1.283	.6299
43	.2777	.1364	88	1.324	.6502
44	.2885	.1417	89	1.367	.6711
45	.2995	.1471	90	1.410	.6925
46	.3111	.1528	95	1.647	.8090
47	.3229	.1586	100	1.918	.9421
48	.3352	.1646	105	2.227	1.0938
49	.3478	.1708	110	2.578	1.2663
50	.3610	.1773	115	2.977	1.4618
51	.3745	.1839	120	3.427	1.6828
52	.3885	.1908	125	3.934	1.9318
53	.4030	.1979	130	4.504	2.2119
54	.4178	.2052	135	5.144	2.5261
55	.4333	.2128	140	5.859	2.8774
56	.4492	.2206	145	6.658	3.2696
57	.4657	.2287	150	7.547	3.7063
58	.4826	.2370	155	8.535	4.1914
59	.5001	.2456	160	9.630	4.7292
60	.5183	.2545	165	10.841	5.324
61	.5370	.2637	170	12.179	5.981
62	.5561	.2731	175	13.651	6.704
63	.5760	.2829	180	15.272	7.500
64	.5964	.2929	185	17.050	8.373
65	.6176	.3033	190	18.954	9.330
66	.6394	.3140	195	21.130	10.377
67	.6618	.3250	200	23.457	11.520
68	.6850	.3364	205	25.993	12.765
69	.7086	.3481	212	29.925	14.696

The Coal Age Pocket Book

EXAMPLES IN HYGROMETRY

Caution—It is absolutely necessary in the use of such formulas as embrace terms or constants of a given denomination to use only values of that denomination. For example, the formula for finding the weight of moisture that will saturate a cubic foot of air at a temperature of t degrees, is

$$w = 0.6235 \frac{p_v}{0.37\ (460 + t)}$$

This is recognized as being derived from the formula previously given for finding the weight of one cubic foot of dry air at a pressure p and temperature t, by substituting for the atmospheric pressure p (lb. per sq.in.), the saturated vapor pressure for p_v (lb. per sq.in.); and multiplying the formula by the specific gravity of water vapor (0.6235) referred to air.

In these formulas, the pressure must always be expressed in pounds per square inch, because the constant 0.37 is in that denomination; and the temperature must be given in Fahrenheit degrees, for the same reason. Also, the weight will be found in pounds per cubic foot and if desired in grains per cubic foot, must be multiplied by 7000, as there are 7000 grs. in 1 lb.

On the other hand, the formulas given for calculating the relative humidity of the air, or the actual vapor pressure contain the constant 88, which is based on barometric pressure (in. of mercury) and Fahrenheit temperatures. The constant 88 is used for all temperatures above 32 deg., and 90 for any temperature below 32 deg.

The table of saturated vapor pressures, on the preceding page, gives the pressure or tension of water vapor for different temperatures (Fahr. scale), from 30 deg. to 212 deg. The pressures are given both in inches of mercury and pounds per square inch.

Example—Find the actual vapor pressure, the relative humidity, dew point and weight of moisture present, in grains per cubic foot, when the readings of the dry- and wet-bulb thermometers are 62 deg. and 54 deg. F., respectively, and the barometric pressure is 28.2 in.

Solution—The actual vapor pressure, in this case, as calculated from the saturated vapor pressure corresponding to the wet-bulb reading ($P_{54} = 0.4178$ in.), is

$$p_v = 0.4178 - \frac{28.2}{30}\left(\frac{62 - 54}{88}\right) = 0.33235\ in.$$

The saturated vapor pressure for the given temperature (see Table) is $P_{62} = 0.5561$ in., and the relative humidity

$$H = \frac{0.33235 \times 100}{0.5561} = 59.7\ per\ cent.$$

The dew-point temperature corresponding to a saturated vapor pressure of 0.3323 (see Table) is 47.7 deg. F.

The actual weight of vapor is

$$w = 7000 \times 0.6235 \frac{0.597 \times 0.2731}{0.37\ (460 + 62)} = 3.6\ grs.\ per\ cu.ft.$$

Two Letters on Public Coal-Land Sales

SYNOPSIS—George Otis Smith declares that the Land Office has sold almost as much coal land in six years under the new valuations as in five years before under the old prices. Since July 1, 1907, it has disposed of 225 square miles. The average price of the assessed lands is $41.30, and of the sales, $18 per acre. In Colorado last year sales of coal resources equaled output. Appraisals have increased taxable values in the states where public coal lands have been evaluated.

Your editorial of Nov. 1 on "The Western Coal Lands" is incomplete in its quoted statements of fact. In the interchange of views between Senator Shafroth and myself, at the recent Philadelphia session of the American Mining Congress, I distinctly stated that the sales of government coal lands under the new system of appraisal compared favorably in acreage with those made under the former practice of disposal at minimum prices. The "solitary square mile" was mentioned only as the high-water mark in public coal-land prices, and as such was used as the basis for some extemporaneous comparisons of taxable values of coal land, of coal-mining plant and of output.

Recent Public Coal-Land Sales

The facts are that in the six years beginning July 1, 1907, when public coal-land appraisals began, the sales numbered 905 entries as opposed to "this one insignificant sale," as you term it, and the area sold was 225 square miles, rather than "a solitary square mile." In the five years prior to July 1, 1907, the acreage of coal lands sold as such was some nine square miles in excess of the area just given.

Again, that "$400 an acre" quoted in the Coal Age editorial is not at all a fair measure of the appraisal prices fixed by the Geological Survey. Under the regulations in force, a large part of the public coal lands will continue to be valued at the minimum prices specified in the law, $10 and $20. Thus it is that more than two-thirds of the sales under the new system have been at those minimum prices and the purchase of large acreages at these prices will doubtless continue. The average price for the 18 million acres appraised in the six years ended June 30 last, is $41.30, while the sales for the same period averaged about $18 an acre, or perhaps $5 more than for the corresponding period prior to 1907. It needs to be understood that the new prices are higher than the old only as well determined differences in tonnage and quality of coal are given consideration in the valuation of the lands. Large areas have been classified and valued, but each forty-acre tract is treated by itself in all appraisals above the minimum rate.

Sales of Coal Lands Equal to Output

In passing permit me to correct some Colorado figures given in Coal Age's excellent report of the Philadelphia meeting. I deny that there are "9,425,000 acres of (public) coal land in Colorado which could not now be purchased at any price and might later be offered for $400 per acre." The facts are: On July 1 last, there were 2,844,202 acres of public lands in Colorado classified and put on the market as coal lands at an average price of $59; there remained awaiting classification 5,037,721 acres, some of which has since been restored to entry; and the restorations to entry as coal land and non-coal land in Colorado during the preceding 12 months was more than 3 million acres. Also, the public coal lands sold in Colorado last year had an estimated tonnage equivalent to the year's output from Colorado mines. Several of these facts were mentioned by me at Philadelphia.

Appraisals Have Increased Taxation on Neighboring Coal Lands

The important subject of taxation, which was given special emphasis both by the Senator from Colorado and in your editorial, is a phase of this matter also fully appreciated by those of us charged by you as having "theories." Indeed, knowing as we do from personal experience and observation, that the development of the West brings in its train large public burdens, it has been a source of particular gratification to those of us working on the valuation of public coal lands in the Rocky Mountain States that our appraisals, which are a matter of public record in the local land offices, have resulted in the increase in taxable values of adjacent lands, and thus augmented the revenue available for public uses.

In counties where the assessors have had the interests of their fellow citizens at heart, the large corporate and private owners of coal lands have been forced to pay taxes on a coal-land valuation rather than on one based on the use of the land for grazing. The reports of this change in practice that come to our attention, both as criticisms from the large holders of idle lands and as requests for assistance by state officials, lead me to venture the suggestion that the local governments have largely benefited by reason of the federal policy of putting a reasonable valuation on the public coal lands.

Furthermore, recent legislation makes it possible for the surface of coal lands to be separately acquired for agricultural use, and such surface patents are being issued for hundreds of thousands of acres, with the result that to that extent the government coal lands are not untaxed any more than have been the millions of acres of railroad and other large grants and holdings of coal lands assessed on only a grazing-land basis. I mentioned this significant fact at Philadelphia.

Why Tax Coal Land and Not Output?

In conclusion, permit me to suggest in the columns of the Coal Age, as I did on the floor at the Mining Congress, that the principle of taxation of coal in the ground has little beyond the sentimental force of precedent to support it. The need of the community for returns from taxable property and the ability of the owners to pay taxes are better harmonized in a system of taxation on output.

Let us extend the principle of the Federal income tax and have state and local taxes that come nearer to varying directly and not inversely with the taxpayers' ability to pay. Moreover, as pointed out by R. V. Norris in his address at Philadelphia, reported in full in the Nov. 1 issue of the Coal Age, even moderate taxation of the coal in the ground puts a tremendous premium on haste and waste in mining, while the suggested method of a tax on output would result in the payment of taxes in maximum amounts at times of greatest production and largest local population and consequent need for public funds.

and would discourage mining in advance or in excess of normal demand.

GEORGE OTIS SMITH,
Director, U. S. Geological Survey.
Washington, D. C.

(Letter No. 2)

Your editorial on "The Western Coal Lands," in COAL AGE for Nov. 1, reminds one of the old definition of a lobster as "a red fish that walks backward," recalling that the lobster is not red, is not a fish and does not walk backward. Confident from constant reading of your journal that you wish to be both accurate and fair, I venture to offer some figures and suggestions. You say:

> Mr. Smith . . . . has managed after a long delay to dispose of a solitary square mile.

While Mr. Smith is doubtless interested in the sale of the public coal lands, the Survey of which he is director has nothing to do with the sale beyond setting the price which, in the majority of cases, is the minimum allowed by law. There has been no delay in the sale of coal lands, as sales have proceeded month by month at practically the same rate as before the present policy was adopted. Instead of "this one insignificant sale," "a solitary square mile," of 640 acres, the government, under the present policy, has sold over 144,000 acres.

SURVEY WOULD PUT SOME COAL LAND BELOW LEGAL LIMIT IF PERMITTED BY LAW

The implication of the second paragraph that the Western coal lands are being held at $400 per acre, as though that were the usual or average price, is misleading, to say the least, for the average is almost exactly $^1/_{10}$ of that figure. As just stated, most of the coal land is and will be priced at the minimum allowed by law, namely, $10 or $20 per acre, and much of it would be priced still lower did the law allow. On the other hand, where the land priced is in the center of one of the fields of high-grade coal, near successfully operated mines, the prices may be as high as several hundred dollars, if the coal is of coking character or if present in many beds or is of great thickness. The land cited by you as selling at $400 per acre is in the heart of one of the best fields of the West and adjoins large working mines, with 70 ft. of developed coal, of probably a little better grade than that of the Illinois and Indiana coal now going into Chicago. Under the present regulations, as high a price as $400 per acre could only be given under these extremely favorable conditions of location and knowledge of coal quality and tonnage. The statement that Western coal lands "held for $400 * * * * * would barely bring $5 or $10 per acre * * * * * if sold by individuals" must certainly have been a slip of the pen. As a matter of fact, the government sale prices are based on and compare favorably with private sale prices in the same fields when the lands are sold on the same basis; that is, for immediate development with both buyer and seller knowing the quantity and quality of the coal.

APPALACHIAN AND WESTERN PRICES

You state in another paragraph:

> The majority of the fuel in the Appalachian States can be bought for $5 to $100 per acre.

Undoubtedly *"the majority"* of the fuel in the Appalachian States can be bought at prices within the limits given, notwithstanding the fact that a perusal of the columns of COAL AGE for the present year fails to show a single sale of coal lands in the Appalachian field at less than $30 per acre and shows many sales at over $100 and up to $2000 per acre. There are doubtless plenty of coal lands in the Appalachian States that can still be bought at less than $30 per acre, and many of them will never be worth that sum. On the other hand, the larger part of the coal lands of the West are and will continue to be valued at the minimum price allowed by law, $10 to $20 per acre.

The unfairness of your editorial is in comparing the highest-priced lands of the West with the lowest-priced lands of the East, as though they are in any way comparable in actual value. It is true that none of the Western coal lands have ever sold at as high a figure as some of those in southwestern Pennsylvania or the anthracite fields of that state, but lands containing good coal, situated near railroads, are limited in the West and, where they occur, the coal finds wide and ready sale, yielding, as a rule, a higher average profit per ton than similar coals in the East.

After all, the value of coal lands is determined by the net profit per ton and the available tonnage and, as most of the limited fields of good coal in the West near railroads are in private hands, and as many of them contain from 2 to 20 times as much available coal per acre as most of the Eastern coal fields, this, with the higher average net profit per ton, will explain the good prices at which coal lands in the West are sold between private parties. A comparison of assessments on coal lands in Colorado, as taken by the writer from the county assessor's manuscript reports (as given on page 34 in Survey Bulletin 424), with the assessments on Eastern coal lands shows that the Western coal lands in the limited fields of high-grade coal are held at as high, if not at higher, figures than lands containing coals of corresponding quality in the East.

LAND VALUATIONS ARE NOT THROTTLING THE WEST

The questions which you raise as to taxation are a little out of my line, but I cannot help noting that the surface of coal lands is open to entry under the homestead, desert land and other forms of non-mineral entry, to whomsoever will use them and thereafter subject to taxation like other agricultural lands; that Wyoming, the principal coal state of the West, does not tax coal in the ground but as it is mined; that instead of "development * * * * * being throttled," the Western coal operators have the same complaint of over-competition as their brothers in the East, though it is not so keen or grinding. The Western coal mines are today amply meeting all of the market demands of that region for coal and apparently are pushing out into territory that would appear to belong to other fields further east, as when Wyoming coals are shipped to Omaha, and they are doing this with probably a little more satisfactory financial returns than the mines of the East. It is this slightly higher return for mining in the West, especially in the limited fields of the better coals, that is reflected in the prices of Western coal lands where sold by private owners. High retail prices of coal in the West are not the result of artificially restricted development, but of long average haul, slightly higher cost of mining (averaging about 30 per cent.) and possibly slightly better net profits.

If it be admitted that the present coal-land laws are en-

tirely inadequate to properly meet present conditions of the coal industry, I cannot see how the public would profit by your suggestion of a return to the last century interpretation of those laws. Rather, we need new laws based on first-hand information that will be fair to present coal owners and operators and to the public as the present owner of much coal and as the present and future users of coal.

GEORGE H. ASHLEY,
Chief, Coal Section, Land Classification Board.
Washington, D. C.

You Are Interested in This

The next few issues of COAL AGE will be the most interesting and valuable ever published. There will be an article on "Shaft Sinking," which will describe how obstacles were overcome when sinking through water-bearing strata. There will also be an article describing the coke plant owned by the State of Tennessee. The author will give valuable cost data, both on construction and operation. Another article will describe the coal fields in Nova Scotia, and still another writer will expound a theory regarding the process of coal formation. He will try to prove that anthracite is the result of extreme pressure, and that it is formed from bituminous coal at a far lower temperature and in shorter time than soft coal is developed.

Then there will be an excellent article defending the flame safety mine lamp, which will show that such lamps have been blamed unjustly for many mine disasters. The author declares that he believes a safety lamp may be crushed in a gaseous mixture without causing an explosion. A European writer has given us an article on "Cementation in Shaft Sinking." This will describe methods employed in France to effectually exclude water from shafts, both during sinking and subsequently. These are only a few of the articles we will print in the next two or three issues. Two or three of those above mentioned will appear next week. If you are interested in the latest progress in coal mining, this reminder is sufficient.

COMING SOCIETY MEETINGS

The Coal Mining Institute of America will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5. C. L. Fay, Wilkes-Barre, Penn., is secretary.

West Virginia Coal Mining Institute will hold its winter meeting at Charleston, W. Va., on Dec. 8, 9 and 10. Neil Robinson, Charleston, W. Va., is president; E. N. Zern, Morgantown, W. Va., is secretary.

The Scranton District Mining Institute will hold its annual dinner in the Town Hall at Scranton on the evening of Nov. 29. It is reported that upward of 1200 banquet tickets have already been sold. J. H. Dague, of Scranton, is president.

An International Exposition on Safety and Sanitation will be held Dec. 11 to 20, at the Grand Central Palace, under the auspices of the American Museum of Safety. Dr. Tolman, of 29 West 39th St., New York City, is director general of the exposition.

The Rocky Mountain Coal-Mining Institute has decided to postpone indefinitely the November meeting which was booked for Denver. This decision is due to the serious strike situation which now exists in Colorado. F. W. Whiteside, Denver, Colo., is secretary.

Fuel Consumption in California

On account of the large production of petroleum in California, and its use for fuel, coal mining has practically ceased in that state. According to Edward W. Parker, of the U. S. Geological Survey, the production of coal in the last two years has been only 10,747 tons in 1911, and 10,978 tons in 1912.

The production of petroleum in California in 1912 was 86,450,767 bbl., of which not less than 50,000,000 bbl. was used directly for fuel. Large quantities of oil were also used in place of coal for gas making, and on the estimate of 3½ bbl. of petroleum, being equivalent to one ton of ordinary bituminous coal, it is probable that from 14,000,000 to 15,000,000 tons of coal would be required to perform in California the service now rendered by petroleum in the production of heat, light and power.

There is still, however, some demand for coal in California, particularly for domestic use and for the bunker trade at San Francisco, but this is almost exclusively supplied by coal from other states or from abroad.

There are within the state a number of small, widely separated coal fields, chief among which are the Mount Diablo field, of Contra Costa County, the Corral Hollow field, of Alameda County, the Priest Valley and Trafton fields, of San Benito County, and the Stone Cañon field, of Monterey County. The first two, which are on the eastern border of San Francisco Bay, and consequently in the west-central part of the state, produce black lignite or semibituminous coal.

The coals in Monterey County are of the same geologic age as those farther north, but they have been altered into true bituminous. The alteration in the San Benito County area has not progressed so far as in Monterey County, but the coals closely approach the bituminous grades. None of these, however, possess coking qualities.

Explosion at Acton, Ala.

An explosion in No. 2 mine of the Alabama Fuel & Iron Co., at 3:45 on the afternoon of Nov. 18 probably entombed 40 miners. Up to 9 o'clock the bodies of L. L. Patterson, E. Bright, John Langston, Henry Childers, Burns Kittrell and two unidentified negroes had been recovered. Kittrell went into the mine to do some cleaning, only five minutes before the explosion occurred. On Nov. 19 the number of dead recovered totalled 24 and 6 had been rescued alive.

Some of the victims are white and some are negroes. The normal quota of employees is 70 men, but as Nov. 17 was payday, some of the men did not report for work on 18th.

The first rescue parties reported several dead, lying beside the tramway of the main slope. State Mine Inspector C. H. Nesbitt and a number of surgeons arrived from Birmingham.

The mine has been considered one of the best equipped in the district.

Erratum

In our issue of Nov. 8, the article entitled "A Central Station in West Kentucky," appeared as being written by Newell G. Alford, of Earlington, Ky. This should have read, "By Newell G. Alford and Robert E. Wipfler, engineers for the St. Bernard Mining Co., Earlington, Ky."

INQUIRIES OF GENERAL INTEREST

Gas in Pump Discharge

We are pumping water 600 ft., from the swags in a nongaseous mine. At the end of the discharge pipe line, we can light the gas. Since no gas is generated in the mine, I would like to ask if you can explain where this gas comes from that is given off at the end of the pipe.

J. W.

Sullivan, Ind.

The gas is probably marsh gas (CH_4) with which the water is charged. It is common, in marshes, to see bubbles of gas rising to the surface of stagnant pools containing more or less organic matter. The slow decay of this matter forms marsh gas, which fact suggested the name of the gas.

In the present instance, the gas given off at the end of the pipe line may have been formed in the same manner; but it is more probable that the gas is given off from the strata underlying the coal seam, in such small quantities as not to have been noticed or detected in the mine workings. There are many mines generating small quantities of gas, in this manner, which are supposed to be "nongaseous mines"; because the quantity of gas generated is so small that it is carried away by the air current as rapidly as formed.

It is probable that, under the action of the pump, the gas absorbed by the water is liberated in the pipe line. The vacuum created by the suction of the pump and the motion given to the water in the act of pumping, would both tend to liberate the gas, which would burn when ignited in contact with air.

Burning Culm Piles

The slow burning of slack piles has proved an intolerable nuisance in many mining camps. Can you give me information of the cause of these piles taking fire and the best way to handle the fire after it has started, so as to cause its extinction?

A. H. GARDNER.

Louisville, Ky.

The cause of slack or culm piles taking fire is commonly due to the generation of heat within the pile. The fire may have been started, in some cases, by a stray spark from a locomotive or chimney; but, in the large majority of cases, the fire is due to spontaneous combustion taking place within the pile. The prevention of these fires is more easily accomplished than their extinction. In order to prevent a culm pile firing, it is necessary to avoid, as far as possible, the mixing of fine coal and slack with the waste of the mine. Another means of prevention is to carry off the heat generated within the pile, as far as this can be done. In some cases, this has been accomplished by drilling holes into the pile and sinking pipes to provide a sufficient ventilation to reduce the heat within the pile; but not allowing of the admission of sufficient air to promote combustion. How far this plan will be successful will depend very much on the inflammable nature of the coal, the size of the pile, the presence of pyrites or sulphur in the coal slack, and other causes that favor the generation of heat.

When fire in a culm pile has attained considerable headway, it is a difficult matter to extinguish it. Water is only a temporary benefit thrown on the pile, as the moisture thus provided greatly assists the decomposition of the coal and the generation of heat, with the result that the fire will be increased rather than decreased, later. A more practicable way of dealing with the situation is to dig out the fire, in its early stages, and do everything possible to decrease the heat being generated in the pile, as previously suggested.

In this connection, we would draw attention to the editorial in the present issue, entitled: Combustion of Coal, which suggests the great value of much mine waste, in the production of power. By the installation of a proper grate and furnace, the waste heaps of former years can be utilized to good advantage, for power purposes. This is what should be done with all culm piles, the burning of which proves a nuisance in any community. No argument is required to prove the economy of so doing. Instead of being a nuisance, the waste heaps then become a source of revenue.

An Important Inquiry

From the time the first issue was published, to the present, I have been an interested reader of COAL AGE, and have been particularly impressed with the practical nature of the discussion, of many important mining questions.

In regard to discussion, there is one question that occurs to me, which I believe should be brought to the attention of readers, and some definite policy decided upon, in order to arrive at practical conclusions as to what should be considered the most safe and sane way of handling the many difficult and dangerous problems that confront mining men today.

We have all noticed that the opinions expressed by practical mining men of equally long experience and intelligence, differ widely as to the best methods to pursue on occasions calling for prompt and efficient action to effect the rescue of lives endangered or the protection of property. It seems to me that some method should be suggested or some means adopted that will determine the superiority of one method over another. Certainly, in the discussion of such important questions as: Starting a Fan after Explosion; The Use of Mixed Lights in Mining; The Building of Collapsible Stoppings; etc., some definite conclusion should be reached. What can be done to gain this end?

CHARTER SUBSCRIBER.

Johnstown, Penn.

[The above is one of a number of similar inquiries received from time to time, and we would be glad to receive suggestions as to the best method of bringing the discussion of a question to a successful and practical climax.—ED.]

EXAMINATION QUESTIONS

Miscellaneous Questions

(*Answered by Request*)

Ques.—What horsepower will be required to haul a loaded trip of 15 cars, weighing 1 ton (2000 lb.) each, up a 5 per cent. grade, 3800 ft. long, at a speed of 350 ft. per min.?

Ans.—When the grade is slight, as in this case, say less than 10 per cent., the weight of the loaded trip can be taken as the normal pressure on the incline; and, in this case, in order to find the load on the rope, it is only necessary to add together the tangent of the angle of inclination or the percentage of grade and the coefficient of rolling friction, which may be taken as 0.025. Multiplying this sum by the weight of a loaded trip will give the load on the rope. Thus,

$$L = 15 \times 2000\ (0.05 + 0.025) = 2250\ lb.$$

If greater accuracy is desired, a certain size of haulage rope should be assumed and its weight added to the weight of the loaded trip. Thus, in this case, a ¾-in. six-strand, seven-wire rope of Swede iron can be used, weighing 0.89 lb. per lineal foot. The total weight of this rope on the incline is then $3800 \times 0.89 =$ say 3400 lb. This makes the total load hauled when the trip is at the foot of the incline, $15 \times 2000 + 3400 = 33{,}400$ lb.

The total load on the rope is then

$$L = 33{,}400 \times 0.075 = say\ 2500\ lb.$$

At the given speed of hauling (350 ft. per min.), the required effective horsepower is

$$H = \frac{2500 \times 350}{33{,}000} = 26.5\ hp.$$

Allowing an efficiency of 75 per cent., which is more than sufficient for any ordinary slide-valve haulage engine, the required horsepower of the engine is $26.5 \div 0.75 = 35$ hp.

Ques.—Find the horsepower of an engine, having two cylinders, each 30 in. in diameter, and a 5-ft. stroke, when the engine is making 60 strokes per min., with an average steam-cylinder pressure of 30 lb. per sq.in. and an average back pressure of 4 lb. per sq.in.

Ans.—The sectional area of each cylinder is

$$a = 0.7854 \times 30^2 = 706.86\ sq.in.$$

The average effective pressure, in this case, is 30 — 4 = 26 lb. per sq.in. The total effective pressure, for a single cylinder, is, then, $706.86 \times 26 = 18{,}378+$ lb. For a 5-ft. stroke and a speed of 60 strokes per min., the piston travel is $5 \times 60 = 300$ ft. per min. At this speed, the horsepower developed in a single cylinder, is

$$H = \frac{18{,}378 \times 300}{33{,}000} = 167\ hp.$$

For a duplex (two-cylinder) engine, at this speed, the horsepower developed would be $2 \times 167 = 334$ hp.

Ques.—(a) What is "lead", and why is it desirable that the valve have lead in a quick-running engine? (b) Why should exhaust pipes be larger than steam pipes?

Ans.—The valve of a steam engine is said to have lead when it is set at a slight advance so as to open the steam port a little before the piston reaches the end of its stroke. By this means, the live steam entering the cylinder assists the steam compressed in that end of the cylinder, to reduce the shock of the reciprocating parts and the engine runs more smoothly.

(b) The volume of the exhaust steam is always greater than that of the live steam admitted to the cylinder, because of the reduced pressure caused by the opening of the exhaust port. In order to accommodate this larger volume and to reduce to a minimum the back pressure in the cylinder, the exhaust pipes should always have a greater sectional area than the steam supply.

Ques.—What must be the sectional area of a square airway that is required to pass 50,000 cu.ft. of air per minute, under a water gage of 1 in., the length of the airway, including the return, being one mile

Ans.—A water gage of 1 in. corresponds to a ventilating pressure of $p = 5.2$ lb. per sq.ft. The formula for ventilating pressure, in terms of the quantity of air in circulation and the dimensions of the airway, is

$$p = \frac{klo q^2}{a^3}$$

But for a square airway, $o = 4\sqrt{a}$. In order to avoid two unknown quantities, it is necessary to substitute this value for o in the formula, which gives

$$p = \frac{4kl\sqrt{a}q^2}{a^3} = \frac{4klq^2}{\sqrt{a^5}}$$

Solving this equation for a, gives

$$a = \sqrt[5]{\left(\frac{4klq^2}{p}\right)^2}$$

Finally, substituting the given values in this equation gives, for the sectional area of the airway,

$$a = \sqrt[5]{\left(\frac{4 \times 0.00000002 \times 5280 \times 50{,}000^2}{5.2}\right)^2}$$

$$= 132.76\ sq.ft.$$

Ques.—Where is a common place for the piston rod of an ordinary hoisting engine to break?

Ans.—Piston rods that are secured to the follower by battering down the end of the rod so as to hold the follower firmly against a shoulder of the rod, instead of using a nut for this purpose, frequently work loose, the rod pulling out of its socket.

A more common occurrence, however, is for the piston rod to develop weakness at the point where it enters the crosshead. This is especially the case when there is any lack of alignment in the guides. The piston rod is more likely to break at this point than elsewhere.

Ques.—What parts of a boiler require strengthening by stays?

Ans.—In a plain cylindrical boiler it is necessary to stay the flat surfaces of the boiler, as, for example, the boiler ends.

COAL AND COKE NEWS

Washington, D. C.

The Interstate Commerce Commission has at last embarked upon what is perhaps its most important coal inquiry. Hearings in the case will be conducted first of all at Philadelphia and later at New York and Washington. The inquiry started on Nov. 17 in Philadelphia but all preparations had been made before that time. The Commission starts the proceedings on its own initiative because of a belief on its part that anthracite rates were unreasonably high. While the rumor is in constant circulation that the commission intends to bring about a reduction of from 15 to 20 per cent. in the charge for hauling coal from the mines to tidewater, no positive evidence in support of the idea can be secured. The fact that the anthracite rates are a good deal higher, relatively speaking, than other freight rates is admitted, and it is also acknowledged that in every recent instance where these rates have come up before the commission for adjudication there has been a reduction or a criticism showing that that body was disposed to reduce them.

Many data have been collected in advance of the actual opening of the hearings. These have been intended to show the character of the ownership of the railroads and of the anthracite deposits, with the apparent intention of demonstrating that this ownership is all in practically identical hands. Elaborate maps showing the movement of the coal have been prepared and filed by the roads and information has been furnished concerning the physical value of the properties and of their equipment. Estimates have also been made of the value of land and other investments, including trestles, sheds, wharves, docks, scales, coal pockets, buildings, etc., used by the coal carriers. Statistics as to the traffic movement on each of the roads have also been compiled and furnished to the commission to afford a basis for decision as to the equity of the anthracite rate. The Government has claimed for some time, that the alleged failure of the roads to live up to the commodities clause has made them less anxious to increase efficiency and decrease mining costs than would be the case if the mines were owned and controlled by an independent corporation entirely dependent on mining for its profits. This has been based on the belief that whenever there was a lack of profit from mining it has been made up by an increase in the charge for hauling the coal and vice versa.

Trust Inquiry to Use Data of Commission

Another assertion concerning the inquiry which opened on Nov. 17 is that an outcome of it may be found in the filing of antitrust suits at Washington as a result of the information developed in the course of the work there. This statement seems to be little more than conjectural, save that there is a basis for it in the fact that there is a disposition among Government officials to look for a ground of complaint, which would enable them to apply the Sherman law and thereby to get the credit of uncovering the violations, and bringing the offenders to justice. It is true, however, that while the scope of the proceedings now pending will be large, it is not possible, accurately, to forecast the extent to which they may be carried and they may have ramifications which are not now altogether evident.

Increased Pay to Trainmen and Full-Crew Bills

Estimates of the increased costs due to the award in the trainmen's arbitration case, have shown that the increase of 7 per cent. in wages will fall very heavily upon the so called coal roads between the anthracite regions and the coast points. This increase in expenses cannot be precisely estimated, but it is regarded as likely to fall heavily upon the same roads that have been already subjected to materially increased expense, in consequence of the full-crew bills adopted by Pennsylvania and other neighboring states within the past few months. The arbitration board declared that an increase in the cost of living equal to at least 7 per cent. of the cost in 1910, had occurred and this was practically the sole ground upon which action was taken. It is not believed to be an altogether fair estimate of the added cost of living in the section covered by the anthracite roads.

With reference to the apparent suggestion contained in the report that additional increases in operating expense will necessitate additional charges for freights, this is but one of many similar suggestions which have lately been coming to the Interstate Commerce Commission and to other Federal authorities, in favor of a prompt action by the commission designed to grant the 5 per cent. increase for which application has been made, or, at all events, to give the railroads some power to make charges above those that are now exacted by them for the movement of freight. It is quite generally admitted in administration circles that the case of the railroads is being greatly strengthened by such action as that of the arbitration board.

An inquiry of some importance and extent was instituted by the Interstate Commerce Commission on Nov. 17 with reference to the rates on bituminous coal from points in Virginia, West Virginia, Kentucky and Tennessee to points in Virginia, North Carolina, South Carolina, Georgia and Florida. The investigation thus planned will extend work which has been in progress in connection with coal rates in the bituminous field for some time past, the previous investigation of such rates having been more or less sporadic and dependent upon individual complaints filed from time to time.

HARRISBURG, PENN.

Suggestions of importance to both the miners and the operators of the anthracite fields were prepared at a meeting of the subcommittee of the mine inspectors of Luzerne County at a recent meeting in Wilkes-Barre. The meeting was the result of a session of the inspectors from this state held about a month ago in that city with James Roderick, the chief of the department of mines of the state.

At the meeting of the committee it was found that more than 75 per cent. of the accidents which occur in the anthracite fields are due to three causes, which are: Falls of coal and rock, the use of powder and other explosives, and to mine cars.

In regard to the first cause in which a large number of men is injured, it was suggested by the committee of inspectors that the chambers and gangways be made more safe by employing an additional number of props and timbers, the latter to be placed at smaller intervals than is now the practice. It was pointed out that in many cases the accidents from falls of coal and rock are caused by the failure of the men to place the timbers close enough together to prevent any of the loose material from coming through. Instances were cited where a piece of rock from the roof had slipped through without any warning and caused injury to either the miner or laborer, when if the timbers had been placed close enough together such an occurrence would have been impossible.

In regard to the use of explosives the committee is determined that more care shall be used in the handling of the same than is now exercised. It was pointed out that the only precautions adopted by many of the men in handling powder are those printed on the package. One bad practice of the miner of today is to open his keg of powder and make a charge while the contents are exposed to view. In many cases a spark from his lamp may fall into the keg, and the next moment an explosion occurs which may cause an explosion of gas and the injury of more men than the miner himself.

Precautions of Susquehanna Coal Co.

A compliment is paid the Susquehanna Coal Co. for the manner in which it is looking after the safety of the men in its employ. It was stated that the company had at its own expense placed 22 men at work, their sole duty being to instruct employees as to how to avoid accidents. The men go through the workings of the colliery daily and make suggestions to the men employed therein, and see that the same are carried out. The result of this system is most satisfactory to the company, and has resulted in a decrease in the number of accidents.

Those who were present at the meeting of the committee and the districts represented by them are: Hugh McDonald sixth; Thomas J. Williams, seventh; S. J. Jennings, eighth; D. T. Davis, ninth; Joseph J. Walsh, tenth; David J. Roderick, eleventh.

PENNSYLVANIA

Anthracite

Mount Carmel—A 7-ft. bed of coal has been found on the Bolich property near Taylorville, and a 25-ft. seam has been discovered at the Locust Spring mine, of the Philadelphia & Reading Coal & Iron Co. The output of the colliery will be greatly increased by this new discovery. The Reading Co., have just opened a new hospital and washroom for the miners at the foot of the Locust Spring shaft.

Dunmore—The Pennsylvania Coal Co. is reported to be negotiating for the purchase of the Sibley colliery of the Elliott-McClure Co., on the mountainside, west of Old Forge. Formal announcement is expected soon.

The Sibley colliery has been in operation for many years as an independent company. The coal beds are said to contain many thousands of tons of coal yet. The Elliott-McClure Co., present owner, is a Philadelphia concern, and has worked this mine for several years.

Scranton—Following the dismissal of two slate pickers, 1000 miners struck at the Bellevue colliery, owned by the Lackawanna Co. The boys charge that the boss was discriminating against them, and when they complained of the alleged unfair treatment the strike was called.

A settling caused by mine working started in the rear of a building on South Washington Ave., the hole was ten feet in diameter and thirty feet in depth. The mine underneath this part of the city is operated by Sloan and the Central Coal Co.

Plymouth—The Delaware & Hudson Co. tract, in the vicinity of No. 4 shaft is perforated like a sieve with cave holes, which allows the surface water to flow into the mine workings, and to prevent this, a force of men have been put to work to change the course of a stream from the mountainside toward Brown's Creek. The borough has instructed its attorney to apply for an injunction restraining not only the D. & H. Co., but also the Lehigh & Wilkes-Barre Coal Co. and Kingston Coal Co., from allowing water to flow over its streets and into Brown's Creek.

The settling in the Dodds mine of the Plymouth Coal Co. caused considerable damage to property on Main St., and for a time it was feared that some of the buildings would topple over.

Bituminous

Brockwayville—The Toby Coal Co. operating in Elk County, has purchased a new tract of coal lands and will open a mine to take the place of the Black Diamond mine, which is almost exhausted.

Harwick—The Allegheny Coal Co. has filed a suit against three miners in which it seeks to recover $500 damages from each, for the defendants' refusal to vacate houses of the company after having received due notice to do so.

Du Bois—The Northwestern Mining & Exchange Co. will soon begin the sinking of a shaft at Cramer Station, Jefferson County, on the Buffalo, Rochester and Pittsburgh R.R., which is expected to result in the building of a new mining village and one of the largest coal operations of that company in this part of the state. Work is expected to start very soon.

Pittsburgh—For almost a year there has been such a brisk market that the demand for good coal land has been steady and it is at present said to be better than in a long time. A 5000-acre tract of coal in Cumberland Township, Greene County, is being examined as to the titles, preparatory to being transferred to a big steel company, the selling price averaging about $1000 per acre. The coal land belongs to J. V. Thompson and others at Uniontown, but just what steel company is buying it has not been disclosed. One rumor is that it goes to the Jones & Laughlin Co., but this is denied by a member of that corporation. Large tracts of coal in Allegheny, Washington and Westmoreland Counties are also being so closely held, as to be practically unobtainable, which accounts for the good prices being obtained for coal farther away from Pittsburgh.

The H. C. Frick Coke Co. recently filed a suit against William P. Snyder in which it seeks to recover $80,000 damages. It is alleged in the statement of claim filed by the company that Snyder and Charles Donnolly, now deceased, owned the McClure Coke Co., which was later purchased by the H. C. Frick Coke Co. It is averred by the plaintiff that it has been compelled to pay obligations which belonged to the McClure Coke Company.

The Pittsburgh-Buffalo Co. has paid to the Union Trust Co., trustee of the first mortgage bonds, $272,000 for sinking-fund account, to retire and cancel bonds of that amount.

The Johnetta Coal Co., a subsidiary of the Pittsburgh-Buffalo Co., during the week satisfied of record $57,144 of mortgages, held by owners of coal lands in Washington County.

WEST VIRGINIA

Clarksburg—The severe storm laid off 2000 miners, railroad cars being unobtainable.

Wellsburg—Four hundred men of the West Virginia and Pittsburgh Coal Co. at Gilchrist and La Belle are out to obtain the 8-hour day, check weighmen and a recognition of the union. The company will not concede the last demand.

Charleston—One death and three nonfatal accidents each working day is the record of the coal mines of West Virginia for the four months ending Oct. 31.

Following the purchase of the New River coal field by British interests, local operators predict that it may not be long until other extensive holdings pass formally into foreign ownership. Agents of D. A. Thomas, Welsh mine owners and capitalists, are in the West Virginia fields, and it is understood they have gathered options on more than 30 properties, with an annual output of 2,500,000 tons.

The case against John P. White, national president of the United Mine Workers of America and other national and district officials was called Nov. 18. The defendants are indicted for alleged conspiracy in restraint of trade.

Governor H. D. Hatfield and Chief Inspector E. A. Henry are conferring on a system of classification of mines into nonhazardous, hazardous and extra-hazardous operations. It is proposed that the more hazardous be more frequently inspected and the system is to be used as a basis for liabilities chargeable under the working men's compensation law.

Coal operators from Kanawha and New River districts met Nov. 8 and appointed a committee to confer with the Chesapeake and Ohio R.R. relative to car supply. Failing redress they propose to appeal to the state public service commission or the interstate commerce commission.

KENTUCKY

Henderson—The coal men nearby have started a price war and prices have been reduced 25 to 50 per cent.

Providence—Several thousand acres of coal privileges in the Lisman, Corluth and Nebo sections have been sold to Pittsburgh capitalists, W. L. Baker, of the Corluth country, secured options on the property some time ago. The syndicate will open mines.

Whitesburg—It is reported that a deal is pending between C. Bascom Slemp, the Virginia congressman and coal operator, and the Mineral Fuel Co. and the Consolidation Coal Co., looking to a change in the ownership of Mr. Slemp's fine coal properties in the Boone's Fork region. Mr. Slemp and a number of other prominent coal operators recently went through the new operations of the Mineral Fuel Co. at Fleming and Potter's Fork, and also visited the Consolidation Coal Co.'s mines at McRoberts, Dunham, Jenkins and Burdine.

ALABAMA

Acton—Twenty-four miners are known to have been killed and at least 12 others are still missing as a result of an explosion at the Alabama Fuel and Iron Co.'s No. 2 mine near here. It said that 43 men, the majority white, went into the workings early today but how many left before the explosion is not known. The Federal mine-rescue automobile car, recently transferred to Birmingham, made a quick run of 34 miles to Acton, arriving at the same time as the Tennessee Coal & Iron Co.'s rescue car which was dispatched by special train. The mine fan was not injured and was set in motion at once.

OHIO

Belle Valley—The Imperial Mine of the O'Gara Coal Co. had another explosion Nov. 12 in which one man was burned.

Columbus—Joint ownership of the Kanawha & Michigan Ry. by the Lake Shore and Chesapeake & Ohio Ry. must cease by order of U. S. Circuit Court.

Secretary B. F. Nigh, of the Ohio-Indiana-Michigan-Coal Association has been called before the Interstate Commerce Commission in the anthracite coal freight hearing. Mr. Nigh represents the association which consists of hundreds of dealers throughout the states of Ohio, Indiana and Michigan who are asking for a general reduction in anthracite rates. It is claimed that the rate to Buffalo compared with other rates of like distance is inequitable.

The joint legislative commission which was named by Governor Cox to investigate and report on a policy respecting the future of the canals of the state will meet in Columbus soon to take evidence. Coal men are very much interested in the proposition as the question of the abandonment of Ohio canals will be considered.

ILLINOIS

Springfield—Pittsburgh Coal Co., of Pittsburgh, purchased at receiver's sale all the properties of the Illinois Collieries Co. in Sangamon, Macoupin, Montgomery and Bond Counties for $2,000,000. The bonds were principally held by the Pittsburgh Coal Co. The receivership dates back to 1909.

Taylorville—The Christian County Coal Co.'s mine is closed and 350 men are on strike to get better terms for two motormen. The men do not work every day and want $87.45 per month.

Eldorado—The miners of the Eldorado Coal & Mining Co. are on a strike, to force the above named company to remove the mine manager, because he permitted violations of the mining law.

The miners have made a complaint to the State Mining Board, asking that the manager's certificate be canceled.

Belleville—Owing to the cylinder head of one of the cylinders of the hoisting engine at the Massie mine blowing out, the mine was closed down several days, and a serious accident was averted by the presence of mind of the engineer in applying brakes, preventing one of the cages dropping.

INDIANA

Petersburg—Parish & Co., of Bicknell, who have leased 1600 acres of coal land west of this city, are testing the territory with core drills for a suitable location for the shaft.

Terre Haute—An explosion occurred at the new mine of the Clovelly Coal Co., near here, on Nov. 10, driving both cages to the top of the tipple and causing great damage to same.

Three men are dead, the result of an explosion in the Higgins-Martin coal mine at Pine Ridge. Two of the men were suffocated, and the engineer died from heart failure, due to the excitement incident to the explosion.

COLORADO

Denver—Forbes, a camp of the Rocky Mountain Fuel Co., 12 miles north of Trinidad was reoccupied by the state militia on Nov. 5 after a skirmish in which Robert Nichol, the superintendent was fired on. The operators in the strike district agreed on Nov. 7 to take back all strikers but those guilty of crimes. It is said there are 140 thus blacklisted. The operators still refused, however, to recognize the union.

Large numbers of miners were returning to work at that date but the fight at Forbes was renewed Nov. 8 killing 5 nonunion men, probably mortally injuring 2 others, less seriously hurting another; four troopers were deported, two nonunion men beaten and four R.R. bridges burned. At La Veta three guards bringing home a miner were ambuscaded and all four men killed.

Gov. E. M. Ammons threatened to call on the U. S. troopers at Fort Douglas as he was hampered by State Auditor Roady Kenahan leaving the state without signing certificates of indebtedness for the support of the militia. At a joint meeting of the chamber of commerce and the real estate exchange, Frank Gove, counsel for the Victor-American Co. offered to give the city or state a mine, as the company officials wanted to see how successful municipal or state operators would be. On Nov. 11, five miners confessed to the ambuscade and murder at La Veta.

Pueblo—Judge Lewis declared to the grand jury investigating the strike, that attempts to prevent the mining of coal, which was still in the ground was not a conspiracy in restraint of trade.

MISSOURI

Fulton—The Callaway Coal Co. has begun stripping operations, with a $25,000 stripping machine at its property five miles southwest of here. The machine, it is estimated, will uncover 200 tons of coal a day, and at this rate between seven and eight acres of coal will be mined in a year. The company has options on 200 acres of coal lands which will be all that will be needed for several years. The machine will remove earth and rock 30 ft. deep at a single operation.

WASHINGTON

Spokane—Attorney N. W. Prockett, of the Puget Sound Traction, Light & Power Co., of Tacoma, Seattle and Olympia, has asked the Public Service Commission for the privilege of putting into effect at once the new tariffs for power furnished the coal-mining operators of western Washington. The privilege will be granted as soon as a few changes are made.

Organization of the Wilkeson Light, Fuel & Power Co. has been finally consummatd by coast men, taking over 960 acres of coal lands in Pierce County near the town of Wilkeson, and including the Briar Hill, Davis and Bowen properties, which are said to contain between 60,000,000 and 80,000,000 tons of high-grade bituminous coal. A townsite will be established and a light, water and power plant put into operation just as soon as possible.

NEW MEXICO

Dawson—Rees H. Beddow states that the explosion of Oct. 23 was caused by coal dust. The U. S. Bureau of Mines found only 0.19 per cent. of methane in the sample of air sent from the mine a week before explosion. In last 10 days experts have hunted gas and have nowhere seen a cap on the lamp. The loss of life is fixed at 263 men.

ALASKA

Cooks Inlet—Capt. Neilson has discovered a valuable deposit of anthracite along the Knik River at the northeastern corner of Cooks' Inlet.

Next year Fairbanks will receive coal from the British Yukon, near Five Fingers, where a mine was opened this year by C. J. Milton and other St. Paul capitalists.

RECENT COAL AND COKE PATENTS

Steam Boiler Furnace—Orland D. Orvis, New York, N. Y., 1,071,787, Sept. 2, 1913. Filed Jan. 20, 1911, Serial No. 603,685.

Gas Producer—Emile Dor-Delattre, Leige, Belgium, 1,072,098, Sept. 2, 1913. Filed July 24, 1911, Serial No. 640,182.

Smoke Consuming Device for Fire Boxes—W. D. Boyce, New York, N. Y., 1,071,689, Sept. 2, 1913. Filed May 15, 1912, Serial No. 697,443.

Furnace Door—F. Orth, Indiana Harbor, Ind., 1,071,786, Sept. 2, 1913. Filed Dec. 4, 1911, Serial No. 663,801.

Water Tube Boiler—Wilheim Schmidt, Cassel-Wilhelmshohe, Germany, 1,072,174, Sept. 2, 1913. Filed April 12, 1911, Serial No. 610,540.

Fire Box for Boilers—J. McClellon, Everett, Mass., 1,072,865, Sept. 9, 1913. Filed June 7, 1909. Serial No. 500,562.

Boiler Furnace—Gustav de Grahl, Zehlendorf, Germany, 1,073,039, Sept. 9, 1913. Filed Nov. 20, 1911, Serial No. 661,352.

Stop for Mining Cars—James A. Nolan, Bowerston, Ohio, 1,072,977, Sept. 9, 1913. Filed Aug. 7, 1912, Serial No. 713,938.

Apparatus for Separating Fine Coal and the Waste Materials Thereof. G. B. Damon, assigner to Lehigh Coal and Navigation Co., New York, 1,072,833, Sept. 9, 1913. Filed Aug. 8, 1908, Serial No. 447,630.

PERSONALS

M. G. Doll has accepted the position of general sales manager with the Bury Compressor Co., of Erie, Penn.

Frank Oakes, former general shop foreman of the Chicago works Link-Belt Co., has been made superintendent of their works at Philadelphia.

C. Willis Adams, former superintendent of the Link-Belt Co.'s Philadelphia works, has been transferred to their Chicago works to take up his duties as assistant to the president.

Oscar W. Schnell, general outside foreman of the six collieries of the D. & H. Co. in Larksville Borough, has resigned his position, and Charles Contine, of the Dickson colliery has been selected as his successor.

C. V. Kerr, the organizer of the Kerr Turbine Co., New York, and later with McEwen Bros., of Wellsville, N. Y., is now connected with the staff of the Centrifugal Pump Department of the A. S. Cameron Steam Pump Works.

Anthony Mohr has returned to Portland, Ore., after a five months visit in the coal mines of eastern Oregon in which he is interested. He reports that the development work in the mines in Wheeler county is far exceeding all expectations.

George Gould, breaker foreman at the South Wilkes-Barre colliery of the Lehigh & Wilkes-Barre Coal Co., has been appointed outside foreman at the Parrish colliery of the same company, to succeed John Bresnahan, who recently resigned.

Hywel Davies and W. J. von Borries have entered into a partnership under the firm name of Davies & von Borries as consulting mining, civil and industrial engineers, with offices at 39 Hernando Bldg., Lexington, Ky., and 110 S. 7th St., Louisville, Ky.

C. L. Newcomb, Jr., has been appointed to succeed G. B. Turner as western representative of The Goulds Mfg. Co.,

Seneca Falls, N. Y. Mr. Newcomb's headquarters will be at 12 Chamber of Commerce, Denver, Colo., and he will look after the company's interest in the Rocky Mountains and Northwestern territories.

M. M. Bardwell, who was formerly located in Louisville as general manager of the coal companies in which Byrne & Speed, of Louisville, are interested, has transferred his offices to the Western Kentucky operation of the Taylor Coal Co. at Beaver Dam. Mr. Bardwell still spends a good deal of his time in Louisville, however.

Elmer O. Long, assistant chief engineer of the Consolidation Coal Co. in Somerset County has tendered his resignation and will engage in business with Frank B. Flick, mining engineer and engineer for Somerset borough. Charles Ling succeeds George B. Glennas general manager of the Sunnyside Coal Co. at Johnstown.

Philip P. Bourne has recently been appointed chief engineer of the Epping-Carpenter Pump Co., with shops at Pittsburg. Mr. Bourne was for eight years, chief of the engineering staff at The Blake-Knowles Steam Pump Works, East Cambridge, Mass. This appointment is in line with other recent activities of the Epping-Carpenter Pump Co., in strengthening their organization and enlarging their business, especially in high duty and centrifugal pumping machinery.

John W. Smith, special disbursing agent of the U. S. Navy with the Matanuska coal mining expedition, was in Seattle recently purchasing horse sleds and other equipment necessary for the transportation of the coal to tidewater, a distance of about 300 miles. It is expected that the entire winter will be spent in moving the coal. There were about 800 tons taken from the experimental mine during the summer. According to Mr. Smith, this will all be aboard the naval ships by June, 1914 ready for its tests.

The Lehigh Valley Coal Co. has announced the following appointments as District Superintendent in the Wyoming Division, to fill the vacancy caused by the death of District Superintendent Joseph J. Jones: J. S. Hammonds, formerly District Superintendent at Henry, Mineral Springs, Franklin and Warrior Run Collieries, to be District Superintendent at Henry, Prospect and Dorrance Collieries; and Sheldon Jones, formerly Asst. District Superintendent at Prospect Colliery, to be District Superintendent at Mineral Spring, Franklin and Warrior Run Collieries.

CONSTRUCTION NEWS

McComas, W. Va.—The Thomas Coal Co. will equip its power station at Mora, W. Va., with new 100-kw. and 200-kw. rotary converters and switchboards, and has ordered the apparatus from the General Electric Co.

Dante, Va.—The Clinchfield Coal Corporation will soon place in operation in its mines eight 5-ton and two 10-ton electric mining locomotives recently purchased from the General Electric Co.

Ellsworth, Penn.—The Ellsworth Collieries Co. has arranged to add to its power-plant equipment a 937-k.v.-a. Curtis turbo-generator unit with 25-kw. turbo-exciter, switchboard panels and accessories. The apparatus will be built and installed by the General Electric Co.

Belmont, Ohio—Belmont Coal Mining Co. is remodeling the outside layout of its Glencoe Mine. The old car haul which extended into the mine was abandoned, and is now being replaced by a shorter and steeper one, which has the advantage of keeping all the machinery on the outside where it is accessible and can be better taken care of. The electric locomotives will now bring the cars out of the mine through an opening made for the purpose, delivering them to a chain car feeder, which feeds them regularly to the chain car haul. The new equipment is being installed by the Fairmont Mining Machinery Co., Fairmont, W. Va.

Elkins, W. Va.—The Davis Colliery Co. is remodeling the tipple at Coalton mine. Preparation is being made for a better grade of lump and egg coal. Shaker screens separate the sizes, delivering the lump and egg coal to separate picking tables. The tables are located over the railroad tracks, running longitudinally with them, and loading into the cars over adjustable booms—thus eliminating breakage. The nut and slack sizes are used for coking. A Bradford cleaner is being installed to improve the quality of these sizes. Contract for this equipment was awarded the Fairmont Mining Machinery Co., Fairmont, W. Va.

INDUSTRIAL NOTES

Bucyrus, Ohio—The recently organized Bucyrus Lumber Co. has taken over the planing mill, coal and builders supply yard of the White Lumber and Coal Co., of Bucyrus.

Oakwood, Ill.—The large new tipple of the Two Rivers Coal Co. at old Missionveld, southeast of this village, is nearing completion, and it is stated that coal will be hoisted here within a few weeks.

Spokane, Wash.—The Summit Coal Co. near the slope mines of the Northwestern Improvement Co. at Cle Elum has been sold to the Roslyn Fuel Company, the consideration being in the neighborhood of $40,000.

Erie, Penn.—The Erie Pump & Engine Works has recently purchased the business, patterns, etc., of the Lake City Engineering Co., of Erie, Penn. The business of the latter firm will be continued under the new management.

O'Fallon, Ill.—All Illinois coal-hoisting records were broken at the Nigger Hollow Mine No. 2, when 4400 tons of coal were hoisted in 7¼ hr.; the previous record being held by a mine at Benld, Ill., which hoisted 4356 tons in 8 hours.

Pittsburgh, Penn.—The H. C. Frick Coke Co. has purchased from the Pittsburg-Buffalo Coal Co. 395 acres of coal land located in Jefferson township, at a consideration of $274,000. The coal underlies 12 tracts of land facing the Monongahela River.

Windber, Penn.—The Berwind-White Coal Co. has closed a deal for the purchase of approximately 2000 acres of coal land owned by the Henrietta Coal Co. adjoining the Berwind-White No. 42 operation. It is likely that an opening will be made in this tract.

Franklin, Kan.—The Western Coal & Mining Co., which is opening up two new mines at this place, has announced that coal has been reached in both. One of the company's new mines at Lexington, Mo., has begun production, while the tipple on a fourth is being built.

Sewalls Point, Va.—The 200,000-ton storage plant of the Gulf Smokeless Coal Co., which has been building for some months, is now completed. It has been given a test, about 500 tons being dumped into the receiving pits and transferred to the storage yard. The plant consists of two 20-ft. concrete receiving pits built in the center of a cleared field. Railroad tracks run across the pits and the coal is dumped from hopper-bottom cars into the pits. After the coal has been dumped, it is dug out by a steam shovel and deposited in the storage yard on either side of the receiving pits.

NEW INCORPORATIONS

Indianapolis, Ind.—The Oak Ridge Coal Co. has been organized with a capital stock of $10,000. Robt. Hall, M. E. Magg and W. E. Linton are the directors.

Indianapolis, Ind.—The Oak Ridge Coal Co. has been incorporated here with $100,000 capital stock, to mine coal. The directors are Robert Hall, M. E. Magg and W. E. Linton.

Minneapolis, Minn.—The British Columbia Collieries Co. has been organized with a capital stock of $500,000. The incorporators are James C. Andrew, George B. Norris, George H. Derry and Walter H. Hickman.

Clarksburg, W. Va.—A charter has been issued to the Norwood Coal Co., with an authorized capital of $10,000. The incorporators are: Karl Horner, Chas. B. Shont, J. Lee Horner, Wm. H. Wolverton and Chas. B. Johnson.

Kewanee, Ill.—The Streicher-Stuhlsatz Coal Co., to conduct mining and construction business, has been organized with a capital of $2000. The incorporators are: John Streicher, John Stuhlsatz, John P. Steeicher and Peter Stuhlsatz.

Bristol, Tenn.—The United Collieries Co. has been organized with a capital of $5,000,000 for the purpose of extensive developments in the Black Mountain coal district. Chas. W. Pondurant is president and manager of the new company.

Charleston, W. Va.—The Horse Creek Block Coal Co. has been chartered, with an authorized capital stock of $100,000. The principal offices of the company will be in Charleston. The incorporators are: G. B. Combs, T. R. Farley, P. R. Hendrick, A. A. Honaker, John Jarrell and G. W. Johnson.

COAL TRADE REVIEWS

GENERAL REVIEW

Hard coal more active as season advances. Companies drawing on their stocks. Soft coal moderately firm with a tendency to decline. Lake shipping about finished.

Seasonable weather conditions have created a demand for hard coal at all the distributing centers, and the trade has attained the greatest activity of the year. The last rush of water shipments to points soon closing to navigation is now on, and there are some anxious phases to the situation. Stove coal continues the leader in demand, and the shortage is becoming more sharply defined as the season advances. While concessions in the circular are occasionally heard of on certain sizes, this is confined almost entirely to shipments threatened with demurrage charges; the market generally is so strong that the companies are already beginning inroads on their storage supplies.

Bituminous coal continues uncertain, with a pronounced wavering tendency, and generally firm, though far from active. The tendency is strongly toward a declining market due to the apathy in general business. Adequate, though not excessive, tonnages are reported at all the large distributing centers, and business is quiet. Contract consumers are showing a disposition to take more on their contracts, however, and it is clear that the more seasonable weather is having an effect upon conditions. The outlook is by no means clear. The opening prices for 1914 are already being discussed, and in view of the possible labor trouble next April, the opinion prevails that a higher level will be established.

An embargo of several days' duration was declared in the Pittsburgh district against Lake shipping as the result of the heavy storm of last week; the tremendous losses by the Lake shipping interests will now make it impossible to move as much coal to the head of the Lakes as was anticipated. Because of the tie-up in transportation facilities there was a temporary urgent demand, manufacturing interests being the worst sufferers, but normal conditions are now about restored. The trade is now face to face with the problem of finding new markets for the Lake tonnages, but with a heavy demand in the West not much difficulty is anticipated. However, the readjustment is being viewed with some uneasiness, particularly because of the rather critical position of the market.

The Ohio market has stiffened up sharply due to the recent storm; Lake shipping has, of course, been badly crippled because of the large number of vessels lost, and a congestion is threatened at some of the junction points. Considerable difficulty is being experienced in getting sufficient coal forward at Hampton Roads to meet contract requirements; shipments have been heavy, and the slow return of railroad equipment from the Lakes is tightening the car supply. Consumers in the Southern market are taking the minimum amounts on their contracts and domestic coal has failed to develop any briskness in spite of the approaching cold weather and uncertain car supplies.

The steam trade in the Middle West is showing improvement, but in spite of the severe weather conditions, the domestic market continues slow. Some storing of coal is already being done in anticipation of possible labor trouble next April.

EASTERN MARKET

BOSTON, MASS.

Hampton Roads coals plentiful, and only a quiet demand. New England consumers accepting deliveries more regularly. Georges Creek and the Pennsylvanias show no significant change.. Water freights easy and anthracite showing possibly a milder tone, but with dealers no less anxious.

Bituminous—The Hampton Roads coals are mulling along, $2.85 continuing the price on what few sales there are of spot coal. There is a sufficiency of coal on hand at all the piers, so the dispatch is excellent, although with most of the agencies the coastwise trade is still being relied upon to furnish the more consistent market. Off-shore the demand is better, but so far confined to the larger shippers. In this section business is only quiet. The corporations are accepting deliveries on their contracts rather more regularly than early in the month and the advance of seasonable weather makes a difference. The prospect for December is not clear, however, and there are many who think spot purchases will continue to be made at the season contract price.

Georges Creek is also quiet, but with a normal movement on contract. The same is true of the better grades from Pennsylvania. There is some see-sawing of prices on the latter, the tendency being down rather than up, however, and all hands are still in doubt as to what the season will bring forth. The inferior coals are slow, and those operations that have been imprudent enough to ship on the market are netting some low prices at New York and Philadelphia. The call here for Pennsylvania is only scattering, and there is nothing that signifies any material improvement in the near future. All-rail trade is in about the same situation as the business at tide.

Freights—Rates from Hampton Roads are still easy at 70@75c. on large sailing vessels, with almost no inquiry for steamers. On Long Island Sound, barges from New York have been moving slowly and freights are up 5c. or so.

Anthracite—The last cargoes are now being loaded for Bangor and other Eastern ports that soon will be ice-bound. The demand is strong everywhere, although retail trade is having a temporary lull. The dealers, however, are still anxious about supplies, particularly of stove, and they are beginning to be in a mildly complaining mood. There have been several short interruptions to the movement of tows the past fortnight and that has meant rather slower shipment than would otherwise have been the case. Less is heard of premium coal in New York and there is perhaps an easier tone than a week ago.

Quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.00@1.55	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.25@2.75	2.50@2.90	2.92@3.02	
New York*	2.55@3.05	2.80@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.90
Boston†				3.72@3.82
Providence†				3.75@3.87

*F.o.b. †On cars.

NEW YORK

Bituminous slow but buyers are quietly accumulating surplus tonnage. Shipments on contracts continue good. Stove coal becoming shorter as the season advances. Most of the hard coals now in short supply.

Bituminous—The New York soft-coal market is in fair condition, but quiet. Consumers, as a rule, are not buying very heavily, but on the other hand, there is the general belief that they want to see more coal ahead at this time of the year. Such a condition is only natural as the appearance of a protracted spell of severe weather would soon wipe out all available supplies, and create a tight situation. It is this uncertainty that is probably the mainstay of the market.

The heavy storm of last week had little effect upon conditions here, particularly as regards Pennsylvania coals; the mines in that district were not in the storm zone, and experienced little or no inconvenience. Car supply on the Pennsylvania R.R., however, tightened up preceptibly toward the end of last week, being reported at only 60% requirements, and showed indications of being inadequate the beginning of the current week. The New York Central is furnishing a full supply. The labor question continues to be a bothersome factor, not so much in the supply, mines having a relatively full complement of men, but finding it impossible to keep them at work steady. The market continues as follows:

West Virginia steam, $2.65@2.75; fair grades of Pennsylvania, $2.75@2.85; good grades of Pennsylvania, $2.85@2.95; best Miller Pennsylvania, $3.15@3.25; George's Creek, $3.20@3.30.

Anthracite—The feature of the New York hard-coal market is the acute shortage of stove coal; the trade seems to be absolutely barren of this grade. Nut coal at the present time is nearly as short as stove, and as a matter of fact, egg is the only grade that can be supplied with any dispatch. This was in short supply a few weeks ago, but has re-

certainly become a complete drug on the market. As a rule business is quiet, not because of the lack of orders, but due more to the difficulty in obtaining tonnage.

In the smaller sizes, buckwheats are generally heavy with the exception of the high grades of No. 1 which are short. Rice coal is holding its own, while barley is exceptionally long. Pea coal continues the leader in the smaller sizes; the trade is expressing the wish that the producers would readjust their preparation so as to increase the proportion of pea coal.

The car supply seemed to be much improved in the region with the exception of the Reading on which the supply is unaccountably tight; apparently, however, this applies more particularly on shipments East.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular*	Individual
Broken	$5.00	.....	$4.95	
Egg	5.25	$5.10@5.25	5.20	$5.00@5.20
Stove	5.25	5.25@5.75	5.20	5.20@5.70
Chestnut	5.50	5.50	5.45	5.35@3.45
Pea	3.50	3.50	3.45	3.45
Buckwheat	2.75	2.60@2.75	2.45@2.70	2.20@2.70
Rice	2.25	2.25	1.95@2.20	1.70@2.20
Barley	1.75	1.60@1.75	1.70	1.40@1.70

*An addition of 2½% is required on the prepared sizes in this column to cover the new Pennsylvania state tax.

PHILADELPHIA

Hard coal showing a consistent improvement with demand good on practically all sizes. Stove coal the leader. Companies beginning to lift their storage supplies. Car supply unsatisfactory. Bituminous uncertain.

The close of this week finds the anthracite trade at the highest stage of activity so far this season. Outside of egg coal almost everything is moving off without any special urging. Stove coal has been scarce for so long a period, that it is an old story, and as the winter advances, the shortage becomes more emphasized. Premiums of anywhere from 10 to 25c. per ton are made but notwithstanding the demand, one still hears of concessions on some of the sizes. Demurrage charges at the distributing points in the regions, for cars held over a certain length of time, is doubtless responsible, in some cases, for this condition. It is no doubt a fact that orders flow in more freely some days than others, and when it happens that there is an accummulation of cars that are approaching the danger line, an inducement in the way of concessions from the so called circular, furnishes a prompt disposition. This probably applies more to egg than any other size, as all other coals are moving freely.

Operations at the mines still continue at capacity, and the output is running well ahead of the corresponding period for last year. Coal stocks are already being depleted on certain sizes, particularly pea and chestnut. It is understood that none of the companies have any appreciable tonnage of stove on hand, and what little they had has doubtless been sent to the market. The car supply seems to vary from day to day. One hears of occasional complaints of the shortage and the situation as a whole is not satisfactory.

In bituminous coal the trade seems to grow worse instead of better. Orders are harder to get, but this may be accounted for by the fact that the operators are still holding to the prices that obtained a month or six weeks ago. A disposition to dicker, has a tendency to bring business, consumers seeming to be willing to buy, if they can do so at their price, or a little lower than what the operators are asking. The consuming trade seems to appreciate the unusual situation and are taking advantage of it. From now on, unless conditions change materially, there is likely to be a marked softening in prices, gradual but apparently sure.

BALTIMORE, MD.

The trade still facing a declining market. Complications from blizzard in mining regions. Car movement easy, and exports increasing.

That the coal trade here is still facing a declining market has to be admitted. This is particularly true in the West Virginia and Pennsylvania bituminous fields, due to the cutting off of heavy shipments to the Great Lakes. The steel industry, the cement trade and other branches of business that use considerable quantities of coal and coke, are all more or less flat.

In West Virginia good grade run-of-mine coals had been cut to 90c., while slack is selling about on the same basis, or in some cases a little less. In Pennsylvania, while little good coal can be had at less than $1.20 and $1.25, it is being offered freely at that price, a decided contrast to a few weeks ago when agencies were begging for it at $1.35 and $1.40.

The coke market is also weak, and it will not surprise the trade to hear that a number of important ovens will be banked at any time.

Complications appeared last week as a result of the blizzard-like weather in West Virginia, shipments being delayed four and five days, and all communication with the mine centers being shut off for several days. There were plenty of cars in the region, the only trouble being that the railroads could not move them as desired. Later in the week the car supply and movement was reported good.

The anthracite trade is quiet. Steam sizes are reported in only fair demand and the domestic grades are in best call.

Exports are again increasing, a total of over 60,000 tons having been sent out the past month, against 45,000 tons for September.

BUFFALO, N. Y.

Bituminous dull and unsteady. Free tonnage difficult to place. Uncertainty regarding readjustment of business following the closing of Lake shipping. Effects of the heavy storm.

Bituminous—The status of the trade at the present time is rather uncertain, but it is clear that there is more bituminous coal offering than there is demand for. Where dealers have good contracts behind them, they express complete satisfaction with the situation but the new jobber seeking to place tonnage is finding it difficult to do so. Indications are that the market will not be clearly defined until after the Lake navigation has closed, and the shipments in that business covered in other markets. Lake business has been heavy this season, and the readjustment will be felt.

Prices are steady and difficult to quote, probably being weak at former figures. There is a surplus of coal all over the eastern part of the state, and probabilities are that there will be a decline, although the trade is not of the opinion that even this will help to move the surplus tonnage. The heavy storm of last week delayed the movement from a day or two to a week. Lake shipments were at the same time reduced to practically nothing. The generally adverse weather conditions, however, have been against a good consumption of coal.

We quote the market weak and unsteady at $2.90 for Pittsburgh lump; $2.80 for three-quarters; $2.65 for mine-run, and $2.25 for slack, the last being no longer any firmer than the sizes; Allegheny Valley coal is quotable at about 25c. less.

Coke—Coke has failed to firm up any even at the reduced price quoted last week. The weak situation is said to be due to a conflict between coke and steel interests, and the outcome is dependent upon conditions in the steel industry. Coke is quoted in the local market on the basis of $4.70 for 72-hr. Connellsville foundry.

Anthracite—The heavy storm and snow blockade of last week was of too short duration to have any material effect upon the situation, and although there is a fair demand for hard coal, the weather is still the controlling factor. Retail trade is dull.

The movement by Lake is good, considering the storm, being for the week 126,000 tons. It is about at an end, though, as insurance on wooden hulls expired on Nov. 15, and will not be obtainable for anything after Dec. 1, except at very high rates. The underwriters will not be free to give extensions unless the vessel is especially promising, the Lake storm already having cost them about $5,000,000.

CENTRAL STATES

PITTSBURGH, PENN.

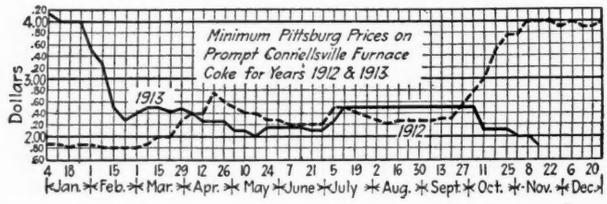
Coal movement recovering from effects of storm and temporary scarcity being relieved. Much Lake shipping lost. Connellsville coke stagnant, with consumption decreasing.

Bituminous—While the coal trade has largely recovered from the sudden rush of demand for domestic coal resulting from the storm referred to in last report, the movement of coal is not yet altogether normal as the railroads were seriously affected. In particular, an embargo was on for several days against coal destined for lake shipment as the terminals at Lake Erie docks were in no condition to receive it. The storm did great damage to lake shipping, destroying at least 125,000 to 150,000 tons of vessel capacity, and although little coal was actually lost, it will be impossible to move nearly as much up the lakes as was expected.

Shipments to manufacturing consumers tributary to the Pittsburgh district were much interfered with, and are hardly normal yet. For several days there was an insistent demand for spot coal, and relatively fancy prices were offered, but the market is now back to its old basis. Mines are running fairly well this week, with the car supply improving after what amounted to a blockade, and with a fair supply

of men. We quote for short contracts and prompt: Slack, $1@1.25; mine-run, $1.40@1.50; ⅞-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district.

Connellsville Coke—The market has been extremely quiet the past week, with many more sellers than buyers. Prices have not yielded materially since last report, but it is not improbable that if any important inquiries had come out they would have developed lower figures. Furnaces are going out of blast and consumption is correspondingly declining. No one is taking any interest in contracts for 1914. It is uncertain how many furnaces will run and those that are sure of running expect lower coke prices so that they are not inquiring. We quote: Prompt furnace, $1.85@1.90; contract (nominal) $2.25; prompt foundry, $1.60@1.75; contract foundry, $1.60@1.75, per ton at ovens.



The "Courier" reports production in the Connellsville and lower Connellsville regions in the week ending Nov. 8 at 354,045 tons, a decrease of 21,185 tons, and shipments at 376,479 tons, an increase of 10,933 tons. The preceding week production had been reported as exceeding shipments by 21,000 tons and the excess of shipments over production the succeeding week has improved the situation.

TOLEDO, OHIO

Heavy storm of last week stiffened the market up sharply. Transportation seriously crippled. Lake shipping badly delayed and a number of vessels lost.

The effect of the recent storm on the Great Lakes and sweeping over this section of the country during the past week has been to stiffen quotations here to such an extent that almost any price can be secured for track coal. The railroads have been urging mine shipments of their orders and as a consequence no difficulty in the way of short fuel supply was felt here.

Cars, however, are scarce. There is practically no equipment on track here and the T. & O. C. was for days the only road open, shipments being greatly curtailed over the B. & O. and Pennsylvania lines, and even yet the movement is exceedingly slow. The railroad men declare that the congestion here is no worse than in other years at the same season and some hope is held out that the freight congestion at other points will be better this year. Heretofore the lack of yard space at Detroit has forced embargoes on north bound freight, throwing back on Toledo the burden, not only of its own cars, but of hundreds of freight cars for Detroit and other northern points.

Toledo roads have long been preparing for the handling of a heavy volume of freight, and some of them notably, the Hocking Valley are in fair shape. The Hocking Valley has just received six new Mikado engines which are said to be the heaviest and strongest freight engines ever in use in this section. About Dec. 1 the 1000 new 115,000 lb. capacity coal cars ordered by this road will be delivered in part at least, which will greatly facilitate the movement; these will be the largest capacity coal cars in use in this section.

The demand for both domestic and steam coal has been good although the warm weather of the past few days has had a quieting influence on the domestic market. Prices are firm and holding unusually close to the list. Many large freighters carrying coal and ore were endangered and some went down during the big storm among them the Henry B. Smith, one of the big ore boats recently built; she foundered off Keweenaw Point, carrying down a crew of 28 men and 10,000 tons of ore.

COLUMBUS, OHIO

Sudden cold snap of last week caused a general stiffening in the market. Car shortage still bad and gradually growing worse. Prices ruling firm and inclined to advance. Lake demand still good.

The feature of the coal trade in Ohio during the past week was the storm which covered the state with about a foot of snow and caused a rush of domestic orders. The long expected had come and in most cases the dealers were able to cope with the situation. Their stocks were fair and they were able to make deliveries promptly despite the icy condition of the streets. As a result no shortage appeared in any line.

The storm also had its effect on the railroads and the movement of coal cargoes was slower than has been the case. Drifting snow and ice delayed all trains and as a result the car supply in Eastern Ohio was only about 40 per cent. of normal. In the Hocking Valley the supply was not much shorter than has been the case for some time and 70 per cent. was reported. In the Pomeroy Bend district the shortage was more pronounced and the output in that section was curtailed to 40 per cent. of the average.

There is a good steady sale of steam sizes and many of the manufacturing plants have gradually increased their requisitions. There is also a slight tendency on the part of managers of factories to accumulate a small surplus to guard against a shortage later in the season.

Lake trade is still active, although hindered by the severe storm which caused a falling off in ore movement and boats engaged in the lake coal business will either have to come back light or carry grain. The car shortage is seriously interfering with the lake movement. There is a good demand from the Northwest and the trade will probably continue until Nov. 25 or even later.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$2.00 @ 1.90	.....	$2.25 @ 2.15	$2.00 @ 1.90
3-4 inch	1.85 @ 1.75	$1.50 @ 1.40	2.00 @ 1.90	1.85 @ 1.75
Nut	1.30 @ 1.20	.....	1.75 @ 1.65	1.40 @ 1.35
Mine-run	1.50 @ 1.40	1.35 @ 1.30	1.50 @ 1.40	1.50 @ 1.45
Nut, pea and slack	0.90 @ 0.85	.....	1.00 @ 0.90	0.85 @ 0.80
Coarse slack	0.80 @ 0.75	1.00 @ 0.95	0.90 @ 0.80	0.75 @ 0.70

DETROIT, MICH.

Increase in demand and a like decrease in car supply. Top prices of the season. Hard coal becoming scarce.

Bituminous—The local steam trade still continues active notwithstanding the advance in prices, and it is freely predicted that further increases are in sight. The railroads are finding themselves unable to cope with the situation, the difficulty seemingly being one of inadequate motive power, rather than lack of equipment.

As a result of these conditions operations in all the mining fields of both Ohio and West Virginia are seriously restricted. The sharp fall in temperature last week developed a new vigor in the trade, and dealers are insisting upon prompt delivery. Stocks in the hands of the large wholesalers are light, and prices are stiff and inclined to advance. Some abnormally high prices have been quoted during the past week. The following is approximately the market at the moment:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.90	....	$2.25	....	....	$3.00	$2.75
Egg	1.90	....	2.25	....	....	3.00	2.75
Nut	1.65	....	1.85	....	....	....	....
Steam lump	1.50	....	....	....	....	....	....
3-in. lump	1.50	$1.50	1.65	$1.65	$1.65	....	....
Mine-run	1.50	1.50	1.50	1.50	1.50	1.75	....
Slack	1.00	1.10	0.90	1.00	1.00	....	....

Anthracite—Dealers in hard coal are already experiencing trouble in making prompt delivery. Spot coal is becoming steadily scarcer and the market is strong on this grade.

HAMPTON ROADS, VA.

Demand still heavy on Pocahontas and New River. Shortage of coal at all piers. Gulf Smokeless Coal Co.'s large storage plant at Sewalls Point completed.

Coal shipments from Hampton Roads for the week have been heavy. A large number of the shippers are short and are having considerable difficulty getting sufficient coal forward to take care of contract business. There have, however, been a few spot sales during the week where some of the suppliers have had an excess of their contract requirements. While it is difficult to get exact figures at which sales have been made prices quoted have ranged from $2.85 to $3 although it is hardly likely any sales have been made at the latter figure.

The present shortage of coal at Hampton Roads is due to two reasons. There has been a shortage of cars on one or two of the roads, due to the fact that cars which have been sent out with shipments consigned to the Lakes have not yet been returned. The demand has also been heavy at all piers during the last few days which has cut down the accumulation. The largest shipments during the week as usual have gone to the New England market although there has been one or two small shipments to Southern ports. Foreign shipments have gone to Port of Spain, St. Thomas, Cristobal, Para, Manos, and Santiago.

KNOXVILLE, TENN.

Market in excellent condition. Car shortage. Domestic prices improve with the season. Large cotton crop and industrial outlook good.

The outlook in the Kentucky-Tennessee fields has never been brighter. The Southern Railway has developed an acute

car shortage, but operators feel that this is compensated for by a general stiffening in prices. This lack of equipment will also be materially relieved by Dec. 1. All roads seem to be making every endeavor possible to handle everything offered them with the utmost dispatch. This is probably due in a measure to the close coöperation between the roads and the Southern Appalachian Coal Operators' Association.

LOUISVILLE, KY.

Closing of Lake shipping having a detrimental effect on the market. Railroads heavy buyers and are storing coal. Market quiet.

The recent cold snap stimulated the local market materially, but it is still rather weak at the moment. The low temperatures were not of sufficient duration to create a permanent demand. In addition to this, the heavy storms brought the lake shipping to an unexpectedly short termination, with the result that this tonnage has been thrown upon the open market.

The railroads are taking abnormally large tonnages which would seem to indicate that they are doing some storing; a few instances where the roads have confiscated coal en route has also been reported. Car supply is good, no complaints having been heard of in that quarter. Domestic quotations are about stationary, with no advance apparent for some time. The increased schedule announced for the 15th of the month was not put into effect, because of the unsettled condition of the market. Eastern Kentucky block is steady at about $2.35, with block and lump at $2.10, round at $1.50, and nut and slack at 80@85c. Western Kentucky lump is active at $1.35, while mine-run is selling at 90c.@$1 and nut and slack at about 70 cents.

SOUTHERN AND MIDDLEWESTERN

BIRMINGHAM, ALA.

Steam coal quiet, but domestic slightly improved. Both furnace and foundry coke slow and blacksmith coal about normal. Practically no demand for pig iron. Car situation shows no improvement.

This week has brought no decided change either way in steam coal. The demand, other than on yearly contracts, is not brisk; the majority of contracts are taking their regular tonnage, though some of the larger ones have reduced shipments to the minimum. The domestic market is rather a puzzle just now; notwithstanding the fact that cold weather will soon be here, and the prospects for cars not encouraging, the producers are not shipping near the normal tonnage for this season of the year and dealers claim to have sufficient stocks for the time being. A few days cold weather, however, will undoubtedly catch many of them short. Consumers using only a car or two each season are waiting until they are forced to buy.

Furnace and foundry coke are both in small demand. Alabama under normal conditions, ships a large tonnage of furnace coke to Mexican smelters, but due to the present trouble, this demand has been temporarily cut off, until there is practically no Birmingham coke moving to Mexico; this is having a tendency to weaken the local market, but even under such adverse conditions, the price is holding up well. Blacksmith coal is about normal, the demand being satisfactory and prices at $2@2.25 f.o.b. mines. The car situation shows little change over last week. With the usual heavy winter movement, little hope can be held out for much improvement in this line.

INDIANAPOLIS

Domestic grades satisfactory in Indiana, both as to demand and price. Lack of cars interfering to some extent with full running schedule. Screening conditions are not improved.

The domestic coal situation is quite satisfactory to Indiana operators. Those mines having the best coal are running full schedule. The car supply is reported better than the movement, blockades at Terre Haute and Indianapolis being still the cause of complaint. The weather has not been favorable to coal consumption, as there have been only a few days so far where the temperature was near the freezing mark.

The local street-car strike gave the domestic movement a boost; there was talk of a sympathetic strike, which would include the teamsters and those short of coal hurried to get in their orders. Some of the retail yards have not caught up yet, although the strike was settled on Nov. 7. Prices for domestic grades are on a good basis. The top mark has been $2 f.o.b. mines but $1.90 is regarded the high end of the range, anything above that being a premium and causing trouble with contract buyers.

Screenings is still a sore spot with operators; for No. 4 from good coal 60 to 75c. can be done but Nos. 5 and 6 sell down to 40c. No satisfactory explanation is had of this unsatisfactory condition. The factories seem to be taking the normal amounts, so that industrial conditions are not held responsible. It is believed that the screenings trouble has its origin with large public utility concerns in Chicago, who seem to be able to fix prices. There has been no revision of retail prices in this city since Sept. 20.

CHICAGO

Domestic coal soft, but the steam market situation is more favorable; many steam users and railroads buying for storage purposes. Smokeless firm. Strong demand prevails for splint with the supply short. Hocking 1¼-in. lump sells at $3.65, f.o.b. Chicago.

Despite colder weather, blizzards in certain coal mining regions and an interruption of traffic, the domestic market in Chicago remains soft. Conditions in the steam trade, however, are more favorable, although it cannot be said there has been any boom.

In an effort to keep their forces at work the operators are turning out steam in preference to domestic sizes. In view of the fact that the agreement between the Illinois operators and miners expires next spring and a cessation of work is expected to follow, many of the larger railroads and steam users are laying by a supply of storage coal. The Chicago & Alton road has arranged to store 75,000 tons of steam coal. Prices for smokeless coal remain firm. Small lots of mine-run are selling at $1.50, with larger quantities on the basis of $1.40 when the coal is on track. Lump and egg command $2.50 in the country and $2.25 in Chicago, with the supply and demand remaining about equal.

Springfield operators are catering to the steam trade and are disposing of much of their product on long-time contracts. Steam lump is selling at $1.25, the mines, while domestic lump is quoted at $1.75. Carterville lump, egg and No. 1 washed is steady at $2, the mines, despite the presence of factors that have tended to disturb prices. The price of Hocking inch and a quarter lump, f.o.b. Chicago, is $3.65 and is a result of an advance to $2 at the mines. Comparatively few shipments are reaching here on account of a tie-up in transportation due to the recent storm. Prices for Indiana coal vary between $1.75 and $2, the mines. High grade, large-sized screenings sell at from 70@90c., the better grades at from 50@75c. and the low grades at from 30@40c. There has been little change in prices for coke.

Prevailing prices at Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.92	2.40@2.55	1.87	3.45@3.55
Screenings	1.12@1.22	1.55@1.80	1.47	

Carterville prices are: Lump, egg No. 1 washed, $3.05; No. 2 washed, $2.80.

Harrisburg quotations are: Domestic lump and egg, $3.05; steam lump, $2.65@2.80; mine-run, $2.40@2.55; screenings, $1.55@1.80; No. 1 nut, $3.05; No. 2 nut, $2.80.

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.90@5; gas house, $4.90@5.

ST. LOUIS, MO.

Market unsatisfactory. No demand for domestic and steam business demoralized. Car shortage the only condition that is maintaining prices.

Instead of getting better the past week, conditions grew worse, mainly on account of the weather. Last week started off well but other parts of the country got the winter weather that St. Louis was promised.

The steam market is in a demoralized condition, and domestic is about the same. In some parts of the Standard field screenings are being given away practically for the freight, and the Carterville market seems to be getting weaker all the time. With Standard screenings at say 10c. a ton and 2-in. lump at $1.10, it is easy to figure out what the Standard operator is making when 40% of his product is screenings and the cost of production is about 80c. or more. In the Carterville market the domestic sizes dropped to 25c. a ton and it also affected Franklin County coals much the same.

The demand for anthracite has eased up considerably, although there is a fairly good tonnage moving in. Coke is rather plentiful with no great demand. It is strictly a jobbers' market now and they are trying to keep the prices up. The same thing applies to smokeless, with plenty moving in and no unusual call.

The prevailing market is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	.....	.....	.....	$1.05@1.15
3-in. lump	.....	.....	$1.50	.....
6-in. lump	$1.75 @ 1.90	.....	1.60	1.25@1.35
Lump and egg	1.85 @ 2.15	Over sold	.....	.....
No. 1 nut	1.40 @ 1.50	.....	.....	.....
Screenings	0.40 @ 0.50	.....	.....	0.10@0.20
Mine-run	1.10 @ 1.20	.....	.....	.....
No. 1 washed nut	1.75 @ 1.85	.....	1.40	.....
No. 2 washed nut	1.40 @ 1.50	.....	1.60	.....
No. 3 washed nut	1.15 @ 1.25	.....	.....	.....
No. 4 washed nut	1.00 @ 1.10	.....	.....	.....
No. 5 washed nut	0.45 @ 0.55	.....	.....	.....

OGDEN, UTAH

Warm weather prevailing throughout Western Territory. All mines in Wyoming and Utah receiving plenty of cars. Mild weather in Colorado delaying coal shortage.

The operators are commencing to worry on account of the fine fall weather that is prevailing throughout the Intermountain territory. The mines in Wyoming and Utah are able to produce a large tonnage of coal when working at full capacity and with mild weather prevailing they are catching up rapidly on their orders. The sugar factories are consuming the slack and steam coal produced which is of great assistance to the mines. Owing to the lack of a severe car shortage this fall the production of steam and slack coal has been above normal, and the factories have not been troubled with their usual coal shortage.

Quotations are as follows:

	California	Colo. & Neb.	General
Lump	$3.00@3.50	$3.00	$2.75
Nut	2.50@3.00	2.50	2.25
Mine-run	1.85	1.85	1.85
Slack	1.00	1.00	1.00

PORTLAND, ORE.

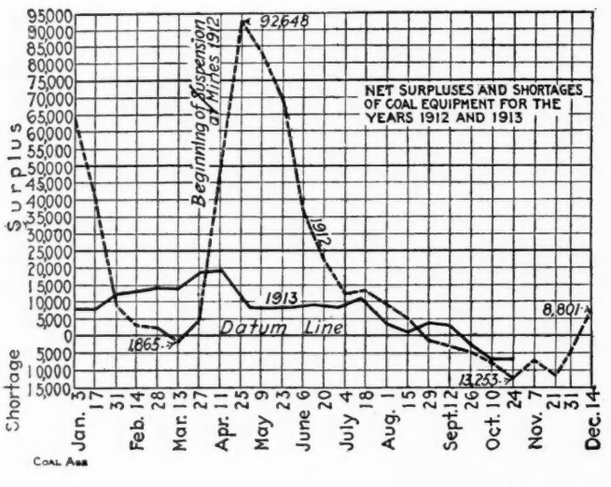
Ship arrives from Australia with 900 tons of coal intended for West Coast of South America. Another vessel due to arrive here soon with 1000 tons from the Antipodes. Retail business active.

The British ship "Segura" has arrived from Australia by way of Salaveri, Peru, with 900 tons of coal. The shipment was not intended for this port, but the ship was caught in a storm while discharging at the South American port's open roadsted and had to cut loose. The cargo was immediately sold here at a somewhat reduced price, but the coal will be retailed at $10.50 per ton, the ruling quotation on Australian coal here at this time. Another shipment of 1000 tons will arrive on a sailing vessel from Australia in a few weeks. This so far as now known, will be the extent of importations from Australia here this fall.

PRODUCTION AND TRANSPORTATION STATISTICS

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Nov. 1, as follows:



	Surplus	Shortage	Net*
New England Lines	86	67	19
N. Y.; New Jersey, Del.; Maryland; Eastern Penn	428	2,331	1,903
Ohio; Indiana; Michigan; Western Pennsylvania	220	3,100	2,880
West Virginia, Virginia, North & South Carolina	691	4,960	269
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	287	607	320
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,134	363	771
Montana, Wyoming, Nebraska	34	118	84
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,218	390	828
Texas, Louisiana, New Mexico	425	13	412
Oregon, Idaho, California, Arizona	2,197	146	2,051
Canadian Lines	0	500	500
Total	6,720	12,595	5,875

	June 30	July 15	Aug. 1	Aug. 15	Sept. 1	Sept. 15	Oct. 1	Oct. 15
Surplus	11,055	13,203	8,810	8,293	8,689	8,714	7,953	6,014
Shortage	2,821	1,826	4,029	7,038	5,209	7,731	10,393	12,502
Net*	**8,234**	**12,377**	**4,781**	**1,255**	**3,480**	**983**	2,440	6,488

*Bold face type indicates a surplus.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for September and the three months ending Sept. 30, 1913, in short tons:

	September			3 Months		
Destination	1913	1912	1913	%	1912	%
Tidewater	461,412	282,244	819,266	18	927,233	22
East	188,570	189,388	552,610	12	554,352	13
West	1,010,987	756,803	2,946,659	63	2,663,989	64
Total	1,460,569	1,228,435	4,318,535		4,145,574	
Coke	29,680	20,058	86,348		62,116	
From connections						
Bituminous	120,468	19,070	318,730	8	55,690	1
Anthracite	1,606	1,195	4,819		2,792	
Total (except coke)	1,582,643	1,248,700	4,642,084	100	4,204,056	100

FOREIGN MARKETS

GREAT BRITAIN

Nov. 7—Admiralty List coals are almost unobtainable for prompt positions, while Monmouthshire large coals are also scarce and dear. Buyers continue to adopt a waiting policy in regard to forward loading. Prices are approximately as follows:

Best Welsh steam	$4.80@4.92	Best Monmouthshires	$3.92@4.14
Best seconds	4.56@4.68	Seconds	3.72@3.90
Seconds	4.38@4.50	Best Cardiff smalls	2.58@2.64
Best dry coals	4.32@4.56	Seconds	2.34@2.46

The prices for Cardiff coal are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for eash in 30 days.

COAL SECURITIES

The following table gives the range of various active coal securities and diyidends paid during the week ending Nov. 15:

Stocks	Week's Range High	Low	Last	Year's Range High	Low
American Coal Products	..	..	80	87	80
American Coal Products Pref	100	100	100	109½	102
Colorado Fuel & Iron	27¼	24½	27	41⅛	24½
Colorado Fuel & Iron Pref	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102½	102½	102½
Lehigh Valley Coal Sales	235	230	240	....	....
Island Creek Coal Com	48¼	47	47½	53⅛	47
Island Creek Coal Pref	84	83½	83½	85	80
Pittsburgh Coal	19⅞	18¼	18¼	24⅜	14½
Pittsburgh Coal Pref	89½	87	88¼	95	73
Pond Creek	18¼	18	18	23⅜	16½
Reading	160¼	156¼	160¼	171	151⅜
Reading 1st Pref	84	84	84	92½	82½
Reading 2nd Pref	84	84	84	95	84
Virginia Iron, Coal & Coke	40	40	40	54	37

Bonds	Closing Bid	Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s.f.g. 5s	93	95	93½	93½	93½	99½
Colo. F. & I. gen. 6s	104	106½	107½	June '12	..	..
Col. Ind. 1st & coll. 5s. gu	78	80½	79⅜	Oct. '13	77½	85
Cons. Ind. Coal Me. 1st 5s	78	79	76	Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	88⅜	93	Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102⅜	April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	91	Oct. '13	91	98
Pocah. Con. Coll. 1st s f 5s	..	86	86	Oct. '13	85	87½
St. L. Rky. Mt. & Pac. 1st 5s	78	79½	78	Oct. '13	73	80½
Tenn. Coal gen. 5s	..	98½	97½	Oct. '13	97½	103
Birm. Div. 1st consol. 6s	100½	101½	100½	Oct. '13	100⅜	103
Tenn. Div. 1st g 6s	100⅜	102½	100⅜	Oct. '13	99	102
Cah. C. M. Co. 1st g 6s	..	..	103	July '13	103	103
Utah Fuel 1st g 5s	..	..	..	....	..	..
Victor Fuel 1st s f 5s	..	80	80	May '13	79½	80
Va. I. Coal & Coke 1st g 5s	92½	94	93	Oct. '13	92	98

Lehigh Valley Coal Sales Co.—Dividend of 25%, payable Jan. 17 to holders of record Nov. 17.

PRICES OF MINING SUPPLIES

MARKETS IN GENERAL

In the face of much adverse news, and in spite of many unfavorable factors, the situation has improved at bottom. The belief that a dollar will be more valuable at a later date has resulted in a stoppage of many enterprises.

There has been a decided falling off in the volume of business, which would indicate that the slowing down has become even more pronounced. This is natural. Conditions grow worse, and are apparent to those guiding affairs, before they are felt in the actual business field.

The iron and steel industry of the country is slowing down gradually, and pig iron is being produced at the rate of 78,000 tons daily, compared with 92,000 tons daily, early in the year. The unfilled orders of the U. S. Steel Corporation fell off 500,000 tons during the month of October, and are now 3,500,000 tons less than at the beginning of the year. Prices have slowly crumbled.

The crop situation shows an improvement. The government reports Nov. 10, indicated a gain of 100,000,000 bu. in corn, and a gain in reserves on the farms of over 60,000,000 bu. Other crops have been as satisfactory as could be desired.

The metal situation continues to show a restriction in the trade. Sales of copper are offered at marked concessions from the high figure in September and stocks are accumulating.

The award of an increase in wages of 7% to the railway trainmen was not a surprise, and the recommendations made by the arbitrators that something must be done to secure more revenue for the railways, was a somewhat unexpected concession. In all, the 41 railways in the eastern part of the United States will pay out about $6,000,000 more per year in wages, and the probabilities are that some increase in rates will be allowed. This, of course, will quickly be reflected in the iron and steel market where the railways are extravagant spenders.

Financial conditions have improved. Many cities which were unable to float their bonds early in the year have now been able to secure the funds needed for improvements, and even for some less judicious expenditures. A distinct gain has been made in municipal bonds, but railroads and industrial companies are unable to finance any new propositions. Monetary affairs abroad, moreover, show an improvement, and American bankers can, if they wish, secure help from Europe. The idle cars of the railways have all been put to work, and for a short period, more rolling stock could have been advantageously used. At one time, railways were short 6000 cars.

Labor disturbances have been far less frequent.

LABOR

The most important announcement in the labor world was that the railway trainmen on Eastern roads will secure an advance of approximately 10% in their wages. At the same time, wages were standardized. The Board of Arbitrators, however, refused to grant the request of trainmen relative to overtime, but indicated that such a matter might come up at a later conference. There have been few strikes of importance during the month, and for the most part, the attention of men has been drawn to securing positions, particularly as some of the larger employers of labor have been drastically curtailing their forces. The Baldwin Locomotive Works has reduced its force of 3000 men or more, about 15% and several firms have gone on part time. A severe car strike occurred in Indianapolis, machinists in Baltimore are striking, and labor troubles in the upper Michigan peninsula are steadily growing better. The strike of the trainmen on the Southern Pacific has been brewing for several months. Railroads have no difficulty in securing men for outside work, and factory hands are easy to obtain.

Immigrants arriving in this country the first 9 months of this year numbered 1,053,220, compared with 747,006 in the corresponding period last year and 595,736 in 1911.

IRON AND STEEL PRODUCTS

An unexpectedly large decrease in the unfilled orders of the United States Corporation in the month ending Oct. 30, unfavorably affected sentiment. This was followed by renewed weakness in the pig-iron market, and a steady falling off in orders for finished products. Most of the retarded business is due to the absence of railway buying, for practically all of the roads in the eastern states are awaiting the outcome of the request for an increase in rates which was recently made to the Interstate Commerce Commission. The only line of steel products in which there has been any semblance of activity is in steel shapes. Here the demand is good, due to the new subway construction in New York. There has been a large amount of material ordered for this and other jobs which will keep the mills actively engaged next year. In spite of numerous efforts on the part of foreign manufacturers to secure business in this country, no sales are reported except for deliveries on the Pacific Coast. The situation as regards scrap steel is particularly disquieting, as prices continue to decline, and there is practically no inquiry. In almost every line, there have been concessions in price granted during the month, and in no particular commodity does it appear that the bottom has been reached.

Pig Iron—Sentiment in the iron trade is more mercurial than in almost any other line of trade, and, just at present, every one connected with the industry feels that the trade is in for a period of declining prices and lessened production. It is not difficult to secure tangible evidence on the subject, for iron is selling at from $3 to $4 a ton less than a year ago, and the blast furnaces of the country are turning out 72,000 tons of pig iron each day, instead of 92,000 tons only a short while ago. Many seem to think that the country will go back to a production of 16,000,000 tons as was the case prior to 1906, but if such is the case, it will upset all precedent. Another factor which has not been given the consideration it should receive, is the statistical position; neither the producers of pig iron nor the consumers have any large stocks on hand and they are not going to permit any to gather. After the brief period of activity in 1910, all the pig-iron interests had a much larger stock of iron on hand than they should have had, and consumers, too, believed at that time that there was to be no limit to the demand for finished products, and so bought most liberally. Now all has been changed, everyone in the trade, and consumers as well, have known for more than a year that a revision of the tariff was probable, and they have been trimming their sails accordingly. Some of those in the trade best qualified to judge are of the opinion that there will be no concentrated buying movement for some time, but they are likewise of the opinion that prices are not far from the bottom.

Quotations for lots of fair size at the points named are as follows: Southern Foundry No. 2 Cincinnati, $13.75@14.25, a decline of 50c.; Southern Foundry No. 4 Cincinnati, $12.75@13.75, a decline of 50c.; Northern Foundry No. 2 Chicago, $15@15.50; Bessemer iron in Pittsburgh is $16.15, which price includes the 90c. freight rate from the valley, and is a decline of 50c. from last month; No. 2 Southern Foundry is $10.50@11.50 in Birmingham, a decline of 50c.

Steel Rails—Some of the smaller railways have purchased moderate lots, and an especially desirable order was received from the Louisville & Nashville. None of the large railways has intimated any likelihood of placing orders in the near future, and it has been more or less officially stated that the Pennsylvania and New York Central would not put out any orders until the early part of next year. These roads will probably require just as many rails for 1914 as they did in 1913; but it is the general policy of the railway companies not to make any commitments not absolutely necessary, until more definite news is at hand, relative to the increase in freight rates.

Quotations are unchanged, $28 per ton for standard section of bessemer rails, and $30 per ton for openhearth rails, f.o.b. Pittsburgh. These prices represent a quotation of $1.25 for 25- to 45-lb. rails, and $1.20 for 16- to 20-lb. rails, in Pittsburgh. In Chicago 16- to 20-lb. rails are quoted at $1.30, 12-lb. rails, $1.33. Relaying rails in Chicago are still held at $24 per gross ton, and in New York at $22.

Track Supplies—Few orders have been placed, and these of small lots. Prices have apparently reached bottom for the present, and there is no cutting for the quotations of last month, which are repeated as follows: Price in large lots f.o.b. Pittsburgh, $1.75@1.80; small lots, $1.90@1.95; in Chicago,

$1.95. Track bolts with square nuts are $2.15@2.25, and angle bars $1.50. All of these quotations are per 100 lb.

Structural Steel—Business is more active than in anything else in the iron-steel line, and there is a likelihood that the mills will be very actively engaged next season, also the fabricating shops. In New York City alone, there will be more work next year than for a number of years past, including such structures as the new Hell Gate Bridge, Equitable Building on lower Broadway, and a great amount of steel for Subway work. General building is inactive, and bids fair to continue so next year, especially in the Eastern cities. On the other hand a great deal of steel is taken in San Francisco and Pacific Coast cities, most of which will come from the East. There are also several large manufacturing plants in the East, which will call for steel construction. The price of fabricated and erected work continues unusually low. Structural shapes are cheaper than a month ago, being quoted at $1.30@1.35 Pittsburgh, for large lots. In Chicago, the price is $1.48@1.53; these quotations are for large lots.

Pipe—Business contiuues fairly active, and in line pipe, there has been specially good demand. The continued decline in raw material and other steel products is responsible for lower prices being named on pipe, which announcement was made at the end of October. This amounts to about $2 per ton, but, however, it affects only pipe larger than 2½ in., internal diameter. It would not be surprising to those in the trade if a further reduction in quotations were made, especially in the smaller sizes, for this trade seems to be stimulated. The following quotations is for fairly large lots, f.o.b. Pittsburgh:

	Black	Galvanized
¾- to 2-in. steel butt welded	80%	71½%
2½- to 6-in. steel lap welded	78%	69½%
7- to 12-in. steel lap welded	75%	64½%

At these discounts the net prices of pipe per foot at Pittsburgh are as follows:

Diameter	Cents Black	Cents Galvanized	Diameter	Cents Black	Cents Galvanized
¾-in.	2.30	3.26	5-in.	30.50	45.00
1-in.	3.40	4.83	6-in.	42.25	58.25
1¼-in.	4.60	6.60	7-in.	59.50	85.00
1½-in.	5.50	7.90	8-in.	62.50	89.00
2½-in.	12.90	17.80	10-in.	$1.03	$1.46
3-in.	16.80	23.30	11-in.	1.13	1.64
4-in.	23.00	33.20	12-in.	1.27	1.82

Sheets—Prices have again declined $2 per ton, and the old story is heard that mills cannot make a profit at these prices and buy sheet bars in the open market. It has been several years since prices have been quoted as low as this, and it is doubtful if these prices will last for any length of time. Most of the mills are refusing to make contracts for delivery after Apr. 1 of next year at these figures. Some of the smaller mills are operating to only about 50% of capacity, and others have 65% of their mills going. Sales have been made as low as 2c. Pittsburgh for No. 28 black, but most of the business has been done at 2.05c. Other quotations are as follows:

SMALL LOTS IN CENTS PER POUND

	Pittsburgh Black	Pittsburgh Galv.	Chicago Black	Chicago Galv.
Nos. 22 and 24	2.55	3.35	2.50	3.30
Nos. 25 and 26	2.60	3.50	2.55	3.45
No. 27	2.65	3.75	2.60	3.70
No. 28	2.70	3.80	2.65	3.75

WIRE PRODUCTS

Wire—Quotations have been cut without, however, stimulating very much buying. As stated, the heavy buying season is over and less business was booked this year than for a number of years past. The quotations are as follows: Pittsburgh painted barb wire to retailers in less than carload lots, $1.70; galvanized barb wire, $2; plain wire, $1.40; in Chicago plain wire is $1.60; painted barb wire, $1.80; galvanized barb wire, $2.10. All of these quotations are per 100 lb.

Wire Rope—Prices are cheaper, due to threatened competition from abroad. There is very little new business. Quotations are lower as follows: for bright cast-steel wire rope, 2½-in., 76c.; 2-in., 50c.; 1½-in., 29c.; 1-in., 14c.; ¾-in., 9c. All of these are per foot.

Copper Wire—The market is nominal, and no large new business has been placed in some time. The quoted price is 17¾c., but there is likely to be a downward adjustment very shortly.

METALS

Copper—Prices have declined steadily, since the last report, with a very small volume of business. Some of the independent sellers have offered electrolytic at 15.25c. and while the largest interests continue to ask 16c., there has been no business transacted at this figure. It is evident that consumption has fallen off materially and most of the demands for the next 60 days have been fairly well covered. Abroad the situation is fully as unsatisfactory, for, there has been a decided falling off in the volume of business in both Great Britain and on the Continent. The statistical position is about as satisfactory as could be desired from the producers' standpoint, and as they have impressed this fact upon possible buyers whenever the occasion offered it is perhaps well to suggest that there is always a turn, and statistics reflect past rather than future conditions. Those in a position to judge the market are of the opinion that quotations are more likely to decline than to advance.

Tin—For the first time in a number of years, an increase in the visible supply of tin has been shown in the reports. Stocks in the U. S. are larger than usual, and the demand is falling off. The price of tin has declined, whether on account of the statistical or other causes, it is difficult to conjecture, but in any event sales have been made at under 40c.

Lead—The market is firm, and sales of large lots are made at 4.35c. New York and 4.20c. St. Louis.

Spelter—While the demand is light, prices continue steady at 5.35c. New York.

Solder—Prices have declined and strictly ½ and ½ solder can be had at 25 to 25½c.

HARDWARE

Nails—Business has been quiet, as the mills are not aggressively seeking orders at these levels, and consumers do not care to make commitments at this time. Wire nails are held at $1.75 Pittsburgh and $2.05 New York, in kegs of 100 lb. and in large lots to consumers, but for small lots from jobber's store, $1.95 is quoted in Pittsburgh and $2.15 at New York.

Iron and Steel—Prices of shapes and angles from jobber's stocks have not declined as much as the mill prices, but this is explained by the very good demand for goods from store as many consumers are buying small lots, so as not to load up with the large shipment from the mill with a dull season ahead. Most of the prices given below, which are for warehouse delivery in Chicago and other distributing centers, are $2 per ton below those quoted last month:

	Per lb.
Refined iron:	
1 to 1⅞ in., round and square	2.00c.
1½ to 4 in. x ⅜ to 1 in.	2.00c.
1½ to 4 in. x ¼ in. to $\frac{5}{16}$ in.	2.20c.
Norway bars	3.40c.
Soft steel:	
¾ to 3 in., round and square	2.00c.
1 to 6 in. x ⅜ to 1 in.	2.00c.
1 to 6 in. x ¼ and $\frac{5}{16}$ in.	2.10c.
Rods—⅝ and 1⅛ in.	2.10c.
Bands—1½ to 6⅝ in. to No. 8	2.30c.
Beams and channels—3 to 15 in.	2.05c.

MISCELLANEOUS

Portland Cement—The portland-cement business is far less active than at any time this year. Some of the largest manufacturers have important contracts to carry over well into next year, but the small concerns have not as good an outlet for their product, and it would not be surprising if there were a cut in the East, which would bring the price down 5 or 10c. per barrel. There has been a reduction in the West of 5c. per barrel, and it is likely that a further reduction will be made before spring. The market is not at all active and seems very weak. Prices are as follows:

Boston, $1.32, not including package.
Pittsburgh, $1.20, not including package.
Chicago, $1.25 f.o.b. not including package.
Cleveland, $1.30, f.o.b. not including package.
Detroit, $1.29, f.o.b. not including package.
Minneapolis, $1.40, f.o.b. not including package.
St. Paul, $1.40, f.o.b. not including package.

Bars, Concrete Reinforcing—The full extent of the lower quotations made in other lines of iron and steel has not been felt in the bar market. The base price for ¾-in. bars, in large lots f.o.b. Pittsburgh, is 1.40c., and for warehouse shipments, 1.85c., but it is not improbable that a large order would bring lower figures. The following prices are f.o.b. Pittsburgh:

	Cents per pound Mill shipments	Warehouse stock
¾-in. and larger	1.40	1.85
⅝-in.	1.45	1.95
½-in.	1.60	2.15
⅜-in.	1.70	2.25
¼-in.	2.00	2.50

Brattice Cloth—Prices have stiffened up surprisingly in the last six weeks, and practically all the benefit of the tariff concession has been lost. Prices have advanced fully 15%, and are now just as high as before the tariff went into effect. The demand is excellent, as this is the heavy consuming season of the year. Deliveries from abroad are slow, but there is still a fair stock in the United States.